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The Outlook

Smashing Up Essen

A SUCCESSION of heavy raids on Essen by Bomber Command is evidence of our growing strength. Although this munitions arsenal has been raided many times since bombing activities commenced in May, 1940, the target is huge, and at first our bomber force was not numerous enough to do crippling damage. During the long period of bad flying weather in the winter months the Germans have doubtless been hard at work repairing the damage, and one knows that this is work at which they are clever and expeditious. Now the weather has improved, and our strength in machines and in bombs has grown appreciably, so we are impressing these facts upon what is perhaps the most vital spot in German war production.

It is not possible for onlookers to decide the order of importance of the various targets which Bomber Command has to visit. The Ministry of Economic Warfare is mainly responsible for advising on that point. We must remember, too, that of late 40 per cent. of the energies of Bomber Command have been expended in helping the Navy; and the Battle of the Atlantic is the most critical of all the struggles in which we are engaged. Bomber Command must always be flexible, and ready to turn at short notice to what the High Command regards as the most critical object at any one time. But when it undertakes strategic bombing, a concentration of repeated effort on one important target is the best policy. A nibble here and a nibble there does little good.

The Prime Minister was probably trying to cheer the public spirits up when he said that the departure of the German warships from Brest would free Bomber Command from the necessity of frequent visits there and allow more scope for attacks on German war industry. The probability is that the energies previously expended upon Brest have now to be diverted to Kiel and Wilhelmshaven. None the less, we are now in a better position than we were before for creating serious interferences with enemy production, and there are probably few places where big bombs well placed pay better dividends than the home of Krupps' works.

Hero Worship

THE grant of a posthumous Victoria Cross to Flying Officer K. Campbell for torpedoing the *Gneisenau* in Brest nearly a year ago brings up the question of publishing the names of R.A.F. men before the announcement of awards in the *London Gazette*. This very gallant officer was the first member of Coastal Command to win a Victoria Cross, while that highest of all war decorations has been granted to several members of Fighter and Bomber Commands.

The Press is always urging the Air Ministry to allow the publication of names before awards are published in the *Gazette*, and it is known that the Air Ministry intends to comply with the request to some extent. The Press in general always hankers after "human interest" in its news, and represents the country as perpetually hungry for heroes to worship.

The same demand was made in the last war, and the question was asked why the names of Guynemer, Fonck, Immelman, Boelcke and von Richthofen should be known all over the world, when few had ever heard of Mannock and other British Aces. The answer given

by the Air Ministry was that all those men were fighter pilots, and it was practically impossible to make a popular hero out of any pilot unless he were a fighter.

This war is not the same as the last, for no large British army is yet fighting on land. Every now and then fighters become the most important class of aircraft, while the great part played by bombers is a standing dish in the daily news. Coastal Command has far fewer opportunities of getting individuals into the limelight, and yet the crews are doing just as gallant work.

It is, in fact, the lone-hand fighter which a section of the Press wants to get hold of and worship, and if the Air Ministry intends to publish more names it is to be hoped that the balance will be held fairly between the several Commands.

Civil Aviation

THE country should be grateful to Mrs. Tate and Wing Commander Wright for raising the subject of civil aviation in the House of Commons. To be able to debate this subject it was necessary for the former to propose an amendment to the Air Estimates and for the latter to second the amendment. The House was obviously in no very receptive mood for switching from the prosecution of the war to the at present somewhat distant subject of post-war civil aviation.

Proposer and seconder both attacked the recently retired Director-General of Civil Aviation, and did not mince matters. In that we think they were unfair to Sir Francis Shelmerdine who, as a civil servant, carried out the wishes of Parliament. It is the system rather than the man that should be blamed. The existing arrangement requires the Director-General to refer important matters to the Secretary of State for Air for decision, and for many years that Minister has been too preoccupied with the R.A.F. to give much attention to civil aviation.

Mrs. Tate and Wing Commander Wright were not in agreement about the handing over of civil aviation to some body other than the Air Ministry. The Hon. Lady no longer wished to do this, whereas the Hon. and Gallant Gentleman wanted to divorce civil aviation "from the discipline of the military machine and give it the freedom of the commercial enterprise that it is." There was a time when the Board of Trade would have been the logical department, and Lt. Col. Moore-Brabazon, among others, never tired of advocating that course. Things have changed since those days, and if a change is to be made, as we hope it will, the Ministry of Transport seems to be the obvious department.

That an inter-departmental committee, such as that which was appointed some time ago, is the right body for planning post-war civil aviation was challenged in the House. Wing Commander Wright suggested an independent committee composed of representatives of chambers of commerce, the T.U.C., Members of Parliament, and the Royal Aeronautical Society. That idea has merits, although no doubt it could be improved upon. The present inter-departmental committee seems to be far too "inter-departmental." Captain Balfour stated that "no fewer than 12 Government Departments" had representatives on it. Heaven help us if a dozen Government Departments are to advise the Paymaster-General on civil aviation.

CONVOY PROTECTION: Harbour areas are protected from low-flying enemy aircraft by ordinary land-type kite balloons flown from barges. Ships under way in convoy fly specially designed balloons. Both types appear in the background.

POWER PLANTING

A Review of the Evolution of Engine Arrangements and Their Effect on Aircraft Design : The Question of View : Drag versus Weight Distribution

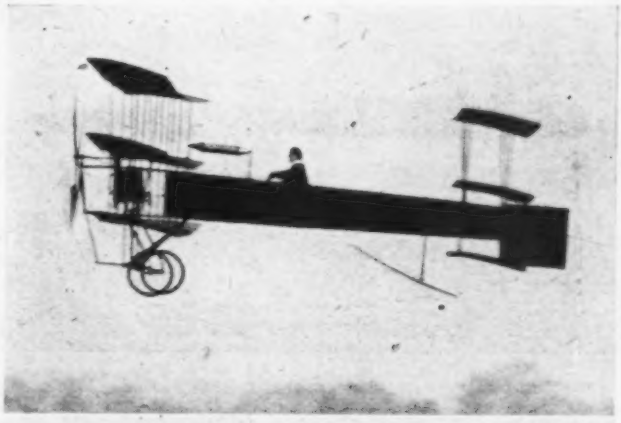
NO matter how you look at it, the engine of an aircraft is always a great nuisance. It costs a lot of money; it weighs a lot; it uses a lot of fuel (more weight); and it is horribly in the way. But until someone discovers or invents something better we shall have to put up with the engine, and aircraft designers have been busy for nearly 40 years finding ways of disposing of the engine in such a manner that its nuisance value shall be as small as possible. Hence the variety of engine locations.

In the very earliest flying days the main question was how to get enough power out of a reasonable weight of metal. The engine of the Wright brothers developed twenty-odd h.p. and weighed 9 pounds per horse-power. Wilbur and Orville decided to lay their engine on the "lower deck" of their biplane, resting on its side. The pilot sat by the side of it. The writer has never been able to discover whether this choice was dictated by a desire to be near the engine so that minor adjustments could be made (confined to the carburettor, probably), or if it was governed by considerations of weight concentration. Be that as it may, the first practical aircraft had this arrangement of pilot and engine. The two pusher airscrews were driven in opposite directions by chains, one of which was crossed.

Pusher v. Tractor

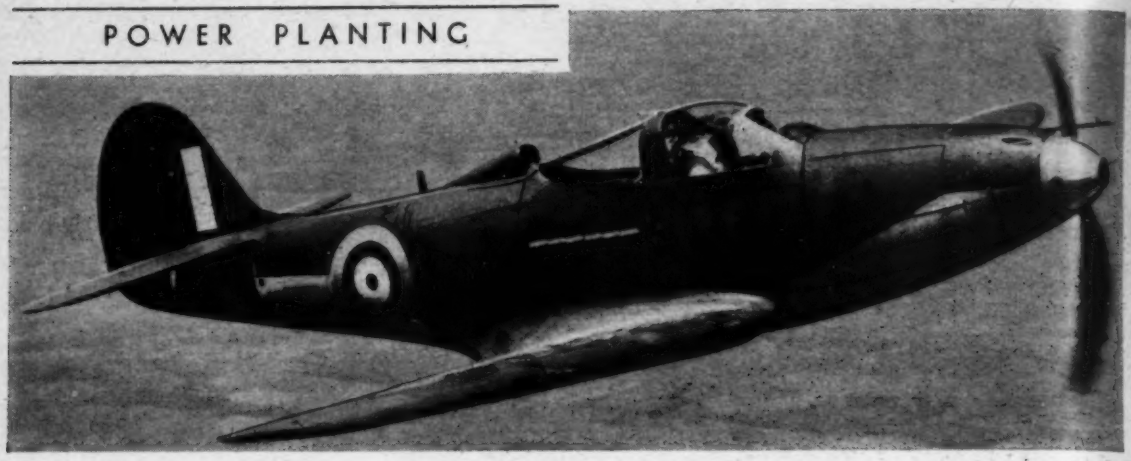
In Europe the "pusher school" got going first, such pioneers as Voisin and Farman favouring the engine-behind arrangement. There were those, however, who considered the tractor arrangement more efficient. There was, for instance, Goupy in France and A. V. Roe (now Sir Alliott Verdon-Roe) in England. Later they were followed in France by Levavasseur and Bleriot. The former designed the Antoinette monoplane, the latter not only designed but piloted his monoplanes.

Many interesting features were incorporated in the Antoinette piloted by Hubert Latham. The machine was a fairly large one, with tapered wings, a peculiar undercarriage, and a *steam-cooled* engine. The engine was mounted in the nose of a boat-like fuselage of triangular section, and the radiators, or,

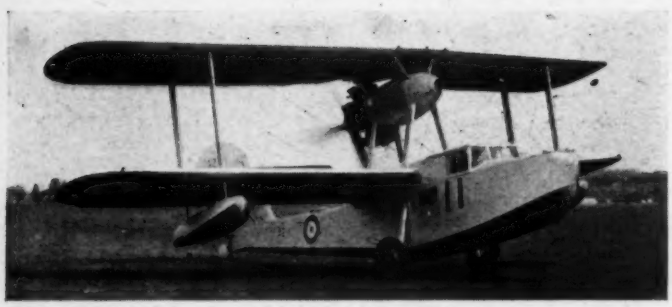


The Avro triplane (top) may be said to have started the tractor "fashion," while the box kite, represented by the Bristol biplane above, was the popular pusher type in the earliest days of flying. In the upper picture the triplane is being piloted by Mr. (now Sir Alliott) Roe. The tail was load-carrying.

POWER PLANTING



A variant of the orthodox clean modern tractor type is the Airacobra, in which the engine is situated behind the pilot and drives the airscrew through an extension shaft.

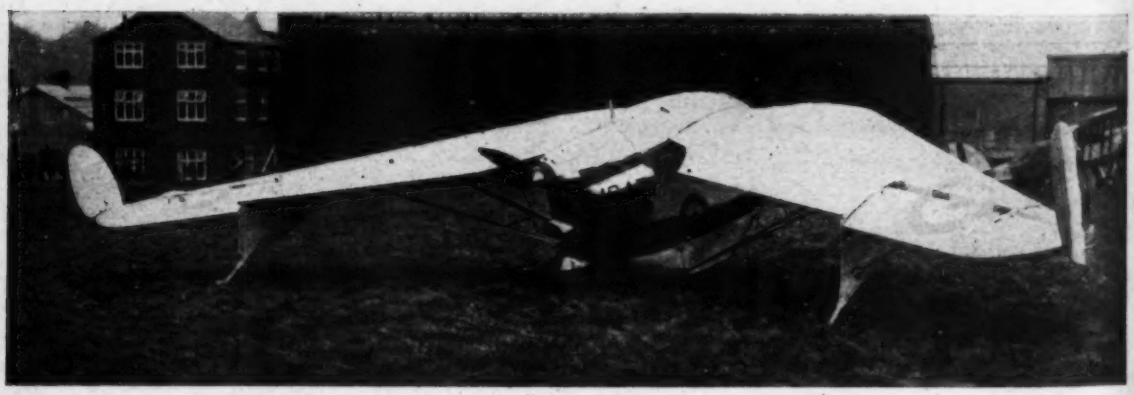


An attempt to combine tractor cleanness with pusher engine was the Shackleton-Lee Murray S.M.1 (top). The Vickers-Supermarine Walrus amphibian boat is a pusher type still in use. The centres of thrust and resistance are kept reasonably in line by the use of biplane wings.

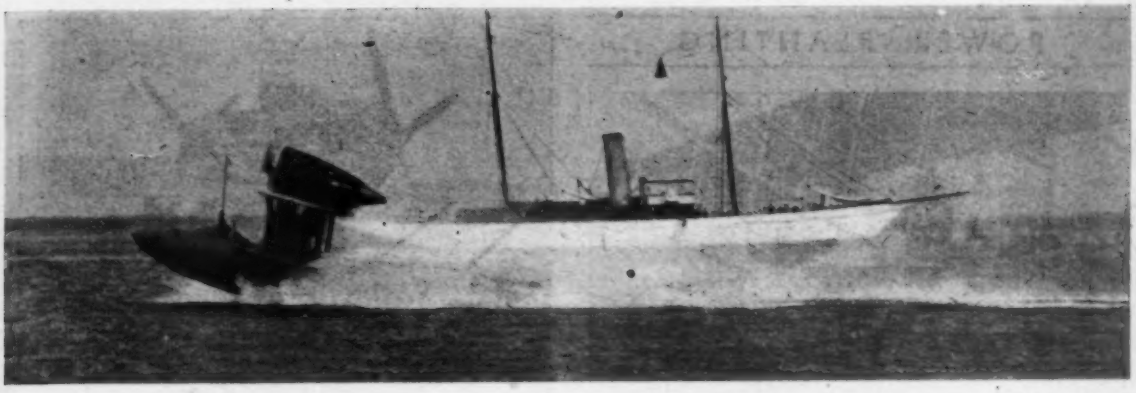
rather, coolers, lay close against the fuselage sides. Although it has nothing to do with the subject of this article, it may be of interest to recall that Levavasseur designed the first monoplane with cantilever wings and "trousered" undercarriage. That bearded old genius certainly had the right ideas.

The Avro triplane with a 9 h.p. J.A.P. engine was also of the tractor type. To get a good view "A. V." placed the pilot's seat aft of the wings. The light engine in front was not able to counterbalance the pilot's weight, and so Mr. Roe made his tail carry a considerable load. It was probably this fact which made the machine somewhat tricky on its controls.

While many other designers continued to produce pushers, Mr. Roe stuck to his guns, and from his early triplane may be said to have been developed all the tractor biplanes which formed the backbone of British aviation until the type was ousted, not so many years ago, by the cantilever monoplane. There is no gainsaying the fact that the tractor could be made much "cleaner" aerodynamically than the pusher. Or at least it was easier to make clean. The old pusher, in order to get airscrew



In the Westland-Hill Pterodactyl the absence of a tail made coincidence of the centres of thrust and resistance possible, an ideal difficult to achieve in a "tailed" pusher.



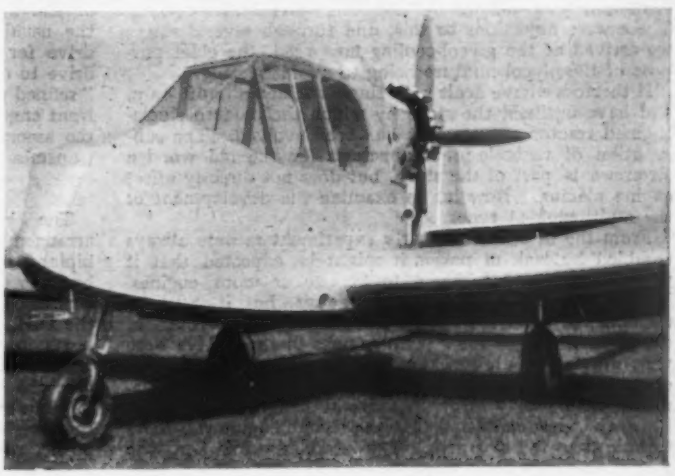
clearance, had to have a fairly tall undercarriage. The placing of the airscrew behind the wings prevented the tail being carried on a streamlined structure, and the open girders used to carry the tails of pushers offered a great deal of resistance. However, at the low speeds then attained, or even contemplated, weight was of greater importance than drag, and the pusher *could* undoubtedly be made very light. The Maurice Farman "Longhorn," for example, carried less than 4 lb./sq. ft.

Triumph of the Tractor

As the cry for greater speed became more insistent, mainly under the urge of war requirements, the pusher had to give way and the tractor became the universal type of landplane and floatplane. The engine in the nose, at first a rotary and afterwards a liquid-cooled, at once introduced problems of cooling and cowling. Many early monoplanes had their Gnomes and le Rhones overhung from a bulkhead just behind the engine. The engine and airscrew projected forward from this bulkhead, and the cowling in many instances was but a small shield over the upper half of the engine. And did those rotaries sling out some castor oil? Partly for cleanness and partly to reduce drag, the cowlings gradually grew until they enclosed the engine, except for an opening in front through which cooling air entered.

When the water-cooled engine came along another problem was introduced: where to put the radiator. In some early types the radiator was placed *above* the fuselage. This did not exactly improve the pilot's view, but may have helped to keep him warm! In most of the early types he sat with half his body exposed to the slipstream.

Then came the fashion of placing a large rectangular radiator in the nose, ahead of the engine. This looked like good car practice, and was a common arrangement for a long time. Familiar types with this radiator arrangement were the S.E.5, the D.H.4, the "Brisfit" and



Variety of single-engine arrangements. Reading from top downwards: The Blackburn Pellet entered for a Schneider contest had a tractor engine placed high. It porpoised. In the Vickers "cow-gun" pusher there was a streamline fairing behind the pusher airscrew. The Parnall Possum had the engine placed in the fuselage, with shaft drive to outboard airscrews. The Arpin monoplane represented a modern attempt at pusher cleanness. The low-wing arrangement may be compared with the parasol wing of the S.M.1 on the opposite page.

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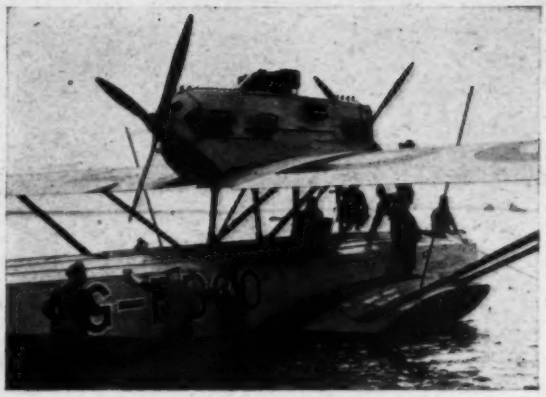
With the wing resting on the hull, as in the Saro Cloud above, the engines have to be raised on "stilts." In the Handley Page Heyford (right) both engines and fuselage were raised to the level of the top plane, an arrangement dictated by military rather than aerodynamic considerations.



The first tandem-engined machine was the Short, shown on the left. It appeared in 1911 and had two Gnome rotary engines, with the pilot seated between them. The tandem arrangement of liquid-cooled engines was particularly favoured for flying boats by Dr. Claude Dornier. Airscrew clearance was provided by making the wing a parasol. The machine shown above is one of the "Wal" type.

the Martinsydes. The large flat surface of the radiator immediately behind the airscrew did not improve the efficiency, and as a next step the radiator was removed from the nose, which was made pore pointed, and placed inside the fuselage and so arranged that it could be raised and lowered through the bottom. That was an improvement in that the amount of cooling could be varied to suit conditions. But the area required was still large, and a reduction was sought by adopting part steam-cooling. There were objections to this, and through several stages we arrived at the glycol-cooling now used, the chief purpose of the glycol mixture being to avoid freezing.

Hitherto we have dealt with single-engined aircraft only, and have outlined the steps by which the modern single-engined tractor arrangement has been evolved. The substitution of variable-pitch airscrews for the old wooden airscrews is part of the story, but does not directly affect engine placing. Now let us examine the development of the multi-engined types.

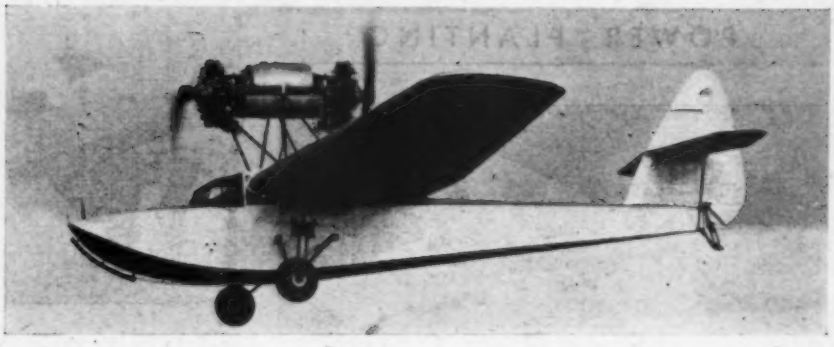
From the fact that the early experimenters were always troubled by lack of power it might be expected that it would soon occur to them to fit two or more engines. This seems an obvious step nowadays, but it must be remembered that simplicity had to be the keynote of design in the beginning. The engines in those days were very unreliable, and the installation difficulties with two engines deterred many designers from taking that apparently easy way. Even in more recent times we have heard the view expressed that the second engine was more trouble than it was worth. The late Harry Hawker, who flew the Atlantic on a single-engined aircraft in 1919, said, when we asked him why he did not select a twin-engined type, "There are merely twice as many chances of engine failure"!

But there *were* designers who, even in the very early days of flying, did not shy at the troubles of a second engine. The late Horace Short was one of them. To him must go the credit of producing the first twin-engined aircraft. It had two Gnome rotary engines, one in front of and one behind the pilot; otherwise it conformed to the usual early pusher type. This machine had direct drive for both airscrews, but other versions had direct drive to one and chain drive to two airscrews. The most "refined" of them had an ordinary tractor fuselage, the front engine being in the normal position in the nose, and the second being housed inside the fuselage, with chain transmission to two airscrews mounted in the wings.

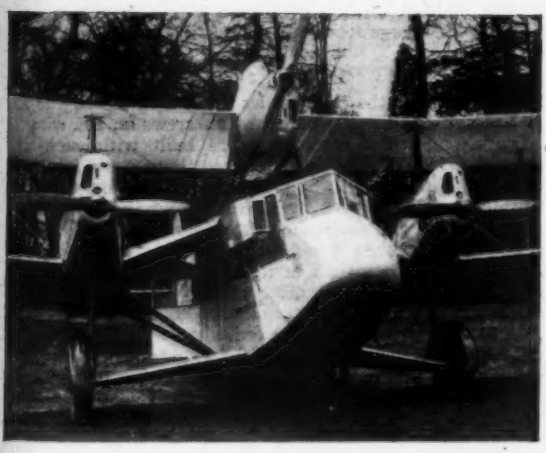
Early Wing Engines

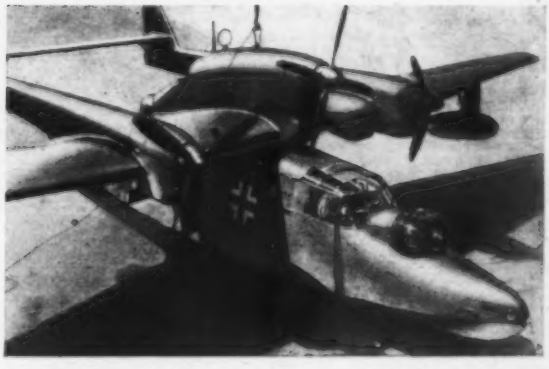
The beginnings of "modernity" in twin-engined arrangements may be said to have been such early biplanes as the Handley-Page O/400 and the D.H.3. Both had the engines located outboard from the fuselage, but whereas the Handley-Page biplane had tractor engines, the D.H.3 had pusher airscrews, with shaft drives. Flying boats, too, were being fitted with two outboard engines, usually mounted fairly high in the wing gap in order to give the airscrews as much clearance as possible.

While on the subject of flying boats it may be recalled that we have in use at the present time one with single pusher airscrew: the Vickers-Supermarine Walrus. This amphibian flying boat has the only engine arrangement



Three Twos. The Hinkler Ibis on the right had tandem engines on "stilts." In the American Bell Airacuda (below) the engines rest on the wings and drive pusher airscrews through extension shafts. The forward portions of the nacelles are gun positions. Tandem engines and contra-rotation, with pusher view for the pilot, were features of the American Johnson shown in the right-hand picture.





Three threes. The Airspeed Ferry on the left had a most unusual arrangement of its three engines. The object was, of course, to avoid an engine in the nose, a more usual arrangement, and one employed in the Italian Cant seaplane shown. The raised centre engine is found again in the fairly modern German Blohm and Voss Ha. 138 flying boat.

possible for aircraft of this type, the nacelle mounted sufficiently high in the wing gap for the airscrew tips to clear the deck of the hull. The design of flying boats has always been influenced by the need for getting the airscrews well clear of the sea. In the earlier types, which invariably had a biplane superstructure, this usually meant that one of the ideals of the aircraft designer had to be sacrificed: getting the centres of thrust and centres of resistance to coincide. The high thrust line causes a diving tendency, as well as introducing a marked change in trim according to whether the engines are "on" or "off." This tendency has to be counteracted by a downward load on the tail. In some of the early boats it was quite the usual thing to find that the tailplane was flying "upside down," viz., that its camber was on the top surface instead of on the bottom. Obviously, the downward load on the tail had to be carried by the wings. It might amount to 1,000 lb. in a fairly large flying boat, a fact which explains why designers strive so hard to get the thrust, drag and lift centres to lie close together.

There was no denying the fact that engines, single or in tandem, on the wings of a biplane offered a good deal of drag. Thus it was natural that designers should turn

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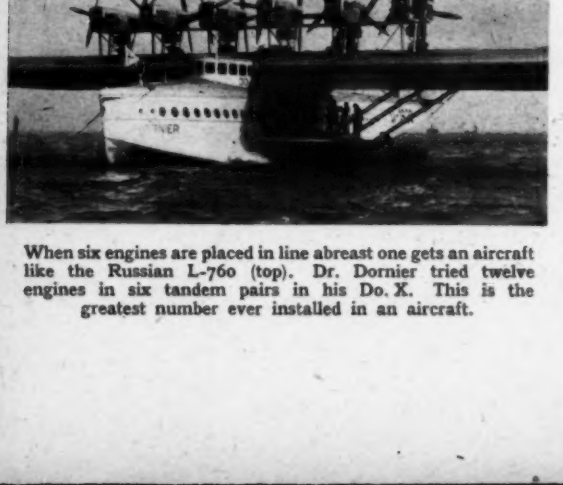
The clean installation of four engines in a biplane is exemplified in the D.H. 86B above. On the left is the double tandem arrangement of the Dornier Do. 26 flying boat. The rear engines tilt to get the airscrews clear of the water.

The Handley Page Halifax bomber represents the modern formula for a large four-engined aircraft with the engines in line abreast.



When six engines are placed in line abreast one gets an aircraft like the Russian L-760 (top). Dr. Dornier tried twelve engines in six tandem pairs in his Do. X. This is the greatest number ever installed in an aircraft.

their thoughts to the possibilities of placing the engine in the fuselage and driving outboard airscrews on the wings. A few experimental machines were built with such an arrangement. That drag was reduced there was no doubt, but a high price had to be paid for this advantage. The transmission gearing was itself heavy, and the concentration of all heavy loads in the centre increased the bending loads on the wings, which therefore had to be made heavier. In spite of its attractions (low drag and the possibility of supervising the engine) the aircraft with central power plant did not come into general use. Something of the sort may be achieved when we come to build really large machines, in which the engines can be buried in the wings. Already the largest types offer possibilities for inspection and adjustment during flight.

Although the Short biplane of 1911 was the first aircraft with its engines in tandem, the arrangement of one engine behind the other has never become really popular with British designers, in spite of its advantages of weight concentration and contra-rotation of its airscrews. Some Short flying boats had tandem pairs of engines, but in the landplane class this arrangement has not often been seen. The late Bert Hinkler built a light plane in which two Salmson engines were so arranged (see photo), but lacked capital to develop the idea which, off-set centres of thrust and resistance notwithstanding, had some considerable advantages. Dr. Claude Dornier, in Germany, favoured the tandem engine arrangement in his "Wal" flying boats, in which the wing was raised above the roof of the hull. At one of the Schneider contests the Italians entered a floatplane with the engines in tandem, the pilot sitting between them, and the tail carried on two booms.

A somewhat freakish arrangement of tandem engines in a "pusher" type was the American Johnson lightplane. The tandem engines were above and behind the cabin, so that the contra-rotating feature was combined with the

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excellent forward view of the old pusher, but the machine did not go into production.

When two engines did not provide sufficient power, and as a safeguard against hurried forced landings in case of engine failure, the three-engined arrangement came into vogue for a time. The usual method was to mount two engines on the wings and one in the nose of the fuselage. A good many machines of this type were built, but it was often held that the nose engine, particularly when fitted on a fuselage of large cross-sectional area, was barely worth its keep. It added drag by blowing the slipstream over the surface of the fuselage, which was thus always in a wind velocity greater than the speed of the aircraft by the amount of the slip. Another disadvantage was that it caused a lot of noise and vibration in the cabin. In this country the three-engined type did not survive for long, although abroad, notably in France (Dewoitine) and Italy (Cant), it is still in use. Variations on the general three-engined theme are shown in the pictures.

The Modern Formula

The argument in favour of several engines, plus the need for more and more power, led to the development of the four-engined class of aircraft. As an article on this subject ("England's Fours") was published as recently as our issue of February 19th, 1942, it is hardly necessary to go into detail. The arrangements possible were: two pairs of tandem engines; two engines on the top plane and two on the lower; and finally four engines in line abreast.

As the cantilever monoplane wing structure came into favour because of the clean design which it made possible, the arrangement of the engines was settled almost automatically. The leading edge of the wing was the obvious place, and the main differences in design were caused by other considerations. For instance, the low-wing arrangement became popular on account of the short undercarriage which it makes possible. There have been high-wing cantilever monoplanes, but the undercarriage legs must necessarily be long, and retraction becomes rather difficult.

In large flying boats the high-wing arrangement is logical because there is no undercarriage to worry about, and the hull is deep so that sufficient water clearance is provided for the airscrews. In smaller boats, however, that would not be so, and for that reason some of the Saunders-Roe flying boats (Cutty Sark, Cloud, and Windhover) the engines were placed on "stilts" above the wing. The arrangement was open to criticism because of increased drag and offset thrust line, but it worked fairly well.

A variant of the engines-on-the-leading-edge theme is provided by the American Bell Airacuda. In this machine the engines are over the wing and drive pusher airscrews through extension shafts. In front of each engine is a gunner's position. The arrangement is obviously chosen from military rather than aerodynamic considerations.

Finally there is the twin-engined arrangement in which two overgrown tail booms form a continuation of the engine nacelles, the pilot sitting in a "blister" in the middle of the wing. The Lockheed Lightning is of this type. It seems doubtful, however, that the drag is any lower than that of the more orthodox arrangement, and the fighting view is probably not too good, as the pilot is not ahead of the engines.

ART IN THE SERVICES

HAVING no means of estimating what proportion of *Flight's* readers possess an appreciation of the finer points of art, it will be safer to approach a review of the Forces' Exhibition at the National Art Gallery from the angle of the visitor who is interested to see what our soldiers, sailors and airmen do in their spare time, rather than from the viewpoint of the connoisseur. Indeed, about the first thing that strikes one, on entering this hall full of paintings, sketches, sculpture, models and what have you, is that our Home Forces must have plenty of time on their hands, though it is quite likely that some of the larger models exhibited—such as the destroyer and locomotives seen in the adjacent picture—are peace-time achievements brought from home specially for this occasion.

There are a number of things in this exhibition of especial interest to *Flight's* readers, not the least being L.A/C. Newman's excellent balsa wood model of a Sunderland (also seen in the picture), the intricate workmanship of which will delight the enthusiastic modeller. There are also models of the Miles Falcon and that gallant veteran, the Fairey Swordfish, both executed with a highly commendable attention to detail and "finish."

The array of pictures will doubtless be regarded by those who know more about aviation than art (which includes the writer) as very much of a mixed bag, and it may well be a case of abysmal ignorance to say that some of them, especially the pencil sketches and water-colours, display more enthusiasm than skill on the part of their creators. But there are some which even the complete tyro cannot fail to appreciate, as, for example, the clever "charcoal" impression of Aldwych station thronged with air-raid shelterers, by A/C.2 P. F. Wilson, which is best viewed from several feet distance.

Then there is the interesting contrast in style between the four pictures of Beaufighters, Hurricanes, Blenheim IVs and Hudsons respectively (in flight) by Sgt. W. A. Bowles, which are remarkable for their clear-cut precision, and the more rugged, bold style of Pte. T. Doughty's three pictures, "Convoy," "Action," and "Escort." Both groups are equally attractive in their individual ways.

MILITARY MODELLERS: Some of the exhibits in the Forces Exhibition now staged in the National Art Gallery, Trafalgar Square. The locomotives and the destroyer display admirable workmanship, while the "stripped" Sunderland and the model of Big Ben in his tower show equal skill in delicate woodwork.

GERMANY'S NEXT MOVE?

Significant Change in Propaganda : Present Disposition of Luftwaffe and Ground Forces: Russian Success Not Yet Decisive : Hitler's Fuel Supplies

By S. KOBRA

AN American wireless commentator has recently pointed out the significant revision of German propaganda in relation to events on the Eastern front. Whereas previously this propaganda, particularly if designed for "home consumption," attempted to exaggerate the importance of successes and to explain away all difficulties or reverses, just the opposite seems to be happening in the last six or seven weeks. The German propaganda seeks to emphasise the hardships suffered by the Germans in Russia. It is, as the said commentator has put it, exploiting the adverse development of the campaign for the purpose of the intimidation of European peoples with the menacing danger of Bolshevisation.

Information filtering from Germany reveals, however, that neither the high personages of the Nazi Party nor the supreme military leaders are much concerned about the failures. Although a number of divisions is reported to have been recently brought from the rear and thrown into the battle, there cannot be the slightest doubt that the bulk of the German armies are not, at present, taking part in the fighting. They are confined to rest camps in Poland and south-eastern Europe, and a not unimportant fraction of the forces is being trained and reorganised in the Reich itself. Perhaps some 10 per cent. of the armoured forces and some 20-30 per cent. of the air forces previously employed on the Eastern front are still there. The majority of German "armoured" and "fast" divisions are drawn back to be overhauled and refitted.

Troop Disposition

A large proportion of aircraft is apparently undergoing a similar treatment. Even if, owing to the Russian counter-offensive, the Germans had to engage a larger proportion of their forces than they originally planned, a far greater part of their ground forces, as well as of the *Luftwaffe*, is now behind the fighting lines preparing for the next move.

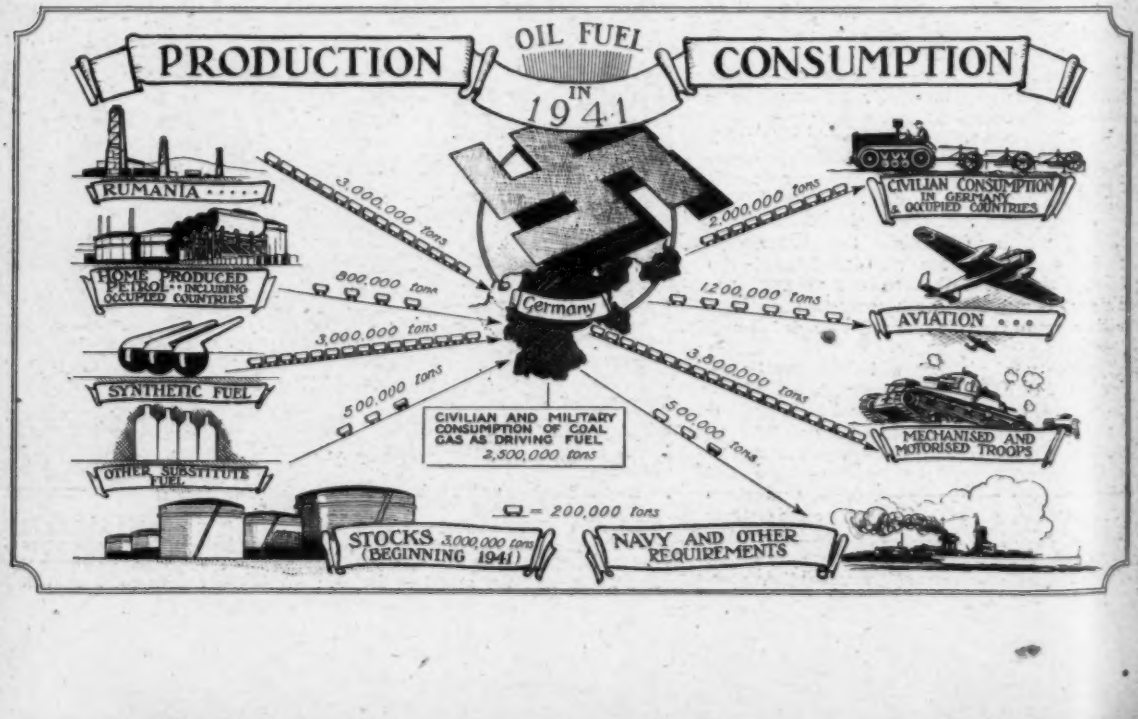
For the time being, however, not much is known of any concentration of German and Italian troops which could betray the future strategic plans. Some German forces which can be regarded as first-line troops are at present near the Turkish frontier, in Thrace and Southern Bulgaria, where significant preparations were reported a few months ago. Among these, the construction of a pipeline across the Danube from Rumania to Bulgaria is of special significance. Yet it seems that the number of troops there has decreased rather than increased since the Russian counter-offensive was launched in the first week of December. Furthermore, quite substantial German forces of the *Luftwaffe*, and probably of the Army, are stationed in Italy in connection with the fighting on the Libyan front.

Military Politics

Although relatively considerable German troops have to be garrisoned all over the vast territories of occupied Europe, there are no signs of any particular concentrations. Apparently, the preparations for a new *ordre de bataille* have not yet begun on a more important scale. Thus it is difficult to base any forecast of the forthcoming Axis military action on the present distribution of their armed forces.

If the German and Italian wireless propaganda is to be taken into consideration, it is the Spring offensive on the Russian front which has to be regarded as their next aim. Their broadcasting, particularly that in foreign languages, is consistently hinting that the offensive operations will be resumed as soon as the weather conditions make it possible. There are certain doubts, however, whether these announcements will prove true. These doubts are based not so much on the latest developments on the Russian front, but rather on some general reflections. The Russian offensive, already lasting more than three months, enables us to ascertain its scope and ultimate consequences.

Without dwelling upon the tactical details, we can say that much as it has done to ease the defence of the vital communications and the industrial and administrative centres of U.S.S.R., it cannot be regarded as a decisive



GERMANY'S NEXT MOVE?

blow which has already deprived the enemy of the power necessary for a new and dangerous assault. Some of the Russian leaders seem to be inclined to overlook this point.

Yet, even if a big-scale German action appears tactically possible, it still remains questionable from the strategic point of view. The following were the fundamental premises of the German attack on Russia: The conviction that their new military doctrine, tested in France and Belgium, would shortly lead to the destruction of Soviet forces; the belief that under the influence of military reverses a disintegration of the Soviet state machine would follow; and, finally, that a centrifugal anti-Soviet movement could, if necessary, be developed among the peasantry dissatisfied about the collectivisation of agriculture (*Kolhozs*). The latter especially applied to Ukraine, where a strong national-Ukranian propaganda against Russians and Bolsheviks was simultaneously launched.

Russian Unity

None of those premises have, however, materialised. A quick and decisive German victory over Soviet forces proved to be impossible. It must be admitted that these forces suffered serious losses in men and in material, and that the German capture of important industrial centres may handicap the Soviet war effort. Nevertheless, in spite of their territorial gains, and with particular regard to their own losses, it is still questionable whether the Germans are now any nearer to the conquest of Soviet Russia than they were at the beginning of the war. Furthermore, they must by now realise that they can hardly hope to bring about anything like a collapse of the Soviet Government.

Supposing, even, that at an extravagantly expensive price they should occupy both Moscow and Leningrad—as they might have done in November—the Soviet Government would, in any event, remain the master of the situation. The power of cohesion of the Soviet state machinery will be fully maintained in spite of any future reverses. The difficulties in supplying the army, in reorganising the industries, in keeping up the communications, will be overcome and the confidence of the population will remain unshaken. It is, indeed, only insufficiently realised in this country how all the German endeavours, though undertaken on a fairly large scale, have utterly failed to disrupt the social or national unity of the population of U.S.S.R.

The possibility of a renewed German drive against Russia cannot be ruled out on the presumption that it will lead to another long and difficult campaign, which would tie up the major part of the German forces. Yet the strategic aims to be achieved must justify those efforts. Nothing short of a total destruction of the U.S.S.R. as a political and military power, resulting in a complete liquidation of the Eastern front and the liberty to transfer the bulk of German armies elsewhere, would be an adequate object of such a new offensive.

It is doubtful whether there will be unanimity in the German High Command, and German political leadership, as to the prospects of attaining the above purpose.

The probability of a new German campaign against Russia, not limited to any defensive action only, must not be examined exclusively from the point of "grand strategy." It is also necessary to have it viewed in the light of one important aspect—that of the German oil supplies.

There cannot be any doubt that, starting the war against U.S.S.R. with a thorough destruction of Russian military power in view, the German High Command reckoned also upon capturing the Caucasian oil fields as the most valuable and coveted part of the booty. To say, however, that the Germans embarked upon the war in order to capture those oil fields would be a simplification to the point of inaccuracy. The war would have come, probably, even if the Soviet country had no oil resources whatsoever.

Nevertheless, it is now frequently pointed out that, since this war started, there has been some change in the position of Germany's oil supplies. Having lasted much longer than it was expected and having required a much bigger effort, the Russian campaign is said to have depleted the German oil supplies. There has always been speculation in this country on that subject. After the first two months of war it was alleged in the bulletin published by one of the most reputable Statistical Institutes that the German oil supplies would be exhausted after a period of four months of full-scale military operations. Quite recently the daily Press came back on this subject.

It seems uncertain how far the published figures may be relied upon. It is known that the average German peacetime oil consumption was close to 6,000,000 tons a year. Since the war started it has been increased by the enormous needs of the air force and of the mechanised units. On the other hand, it has decreased owing to the drastic restrictions of the motorised goods, passenger and private transport. Moreover, not only the civilian but also military vehicles switched over from petrol to the use of gas (*Leuchtgas*) for fuel.

Already, when travelling across the German occupied part of Poland in the first months of the war, the writer noticed among the hundreds of military lorries only a few which were still driven on petrol instead of gas. Maybe that in the more remote parts of occupied Soviet territories and in the Balkans the liquid fuel only can be used. Still, the economy in petrol consumption achieved by the almost general use of gas all over the Reich and most of the occupied countries must not be underrated.

Oil Fuel Essential

The annual production of petrol, including the Rumanian, Polish and German wells as well as synthetic products, is probably reaching something between 7,000,000 and 8,000,000 tons. Consequently the gap between the supplies and the demand should not have been too excessive in the past. In the months of comparative lull certain supplies might possibly have been accumulated. The six months of expensive operations on the Russian front have most probably devoured those supplies. It is possible that with a further numerical development of the *Luftwaffe* and of the armoured forces, necessitated to keep pace with the air and land forces of the Democracies, the balance in the fuel situation is becoming less and less favourable for the Axis.

But is the oil famine so acute as to dictate the next step of the German military machine? Should this prove to be so, it would be a most conspicuous triumph for the British blockade policy. For it would mean that the blockade can be credited not only with enforcing upon the enemy the experience of some serious difficulties in his war preparations, but also with driving him to certain deviations in his war plans and thus influencing his strategy.

Should this prove true, the route to the Caucasus (either across the Crimea and the banks of the Don and Kuban or along the Southern coast of the Black Sea) might become one of the pivotal points of the globe. Then the entire consolidated power of the allied anti-Axis forces must be, and certainly would be, concentrated on barring this route against the enemy.

Aircraft Work for the Blind

SOME time ago Phillips and Powis Aircraft, Ltd., introduced a new scheme for training draughtswomen. That scheme is proving a considerable success. Last week the firm announced another pioneering venture, at a luncheon in London at which Col. Llewellin, the new Minister for Aircraft Production, and Sir Ian Fraser, chairman of St. Dunstan's, were present. Recently a number of blind men, trained at St. Dunstan's, had been taken into the P. and P. works, where they began with such simple operations as removing the burr from the edges of machined parts. They then went on to inspection, first by "go" and "not go" gauges, and afterwards more advanced forms. Even assembly of parts was not beyond them.

BEHIND THE LINES

Service and Industrial News from the Inside of Axis and Enemy-occupied Countries

Synthetic Rubber

NEGOTIATIONS for the establishment of a synthetic rubber plant are in progress between German and Rumanian companies. The plant, to be erected in Rumania, will have a capacity of 3,000 tons a year. The manufacturing process is to be based on the local oil resources.

Magnesite Production

THE recently established German Magnesite Company, with headquarters in Munich, has taken over all Austrian magnesite mines and manufacturing plants. Since January 1st, 1942, the German Magnesite Company has controlled the entire production in the Reich. Originally American private interests participated in the development of the newly absorbed Austrian firm.

Fusion

THE extent to which the Germans are co-ordinating their industrial effort is strikingly shown by the new merger of the A.E.G. and the "Gesfürel."

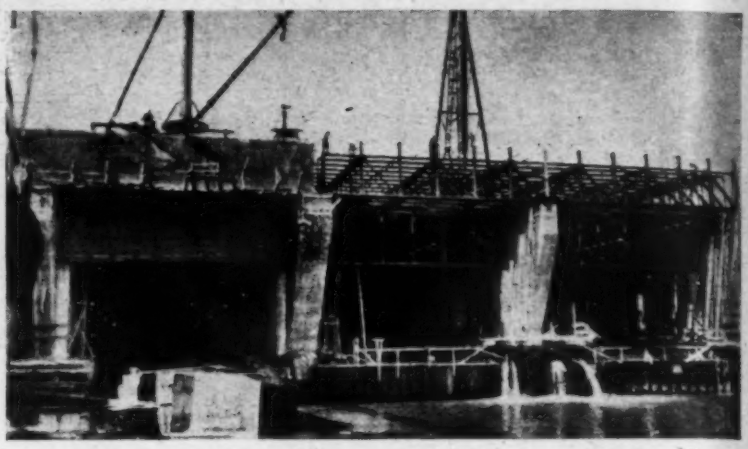
The new combine embraces the following industrial concerns:—The Telefunken A.G., the Ago Aircraft Works in Oschersleben, the Loewe Tool Machines A.G., the Finow Copper and Brass and Light Metals Works, the "Elektrowerk" Manufacturers of Wireless Equipment in Nueremberg, the Sachsenwerk Wireless Equipment, the Apparat-Bau in Eslingen and the A.E.G. Plant in Stuttgart, the Richard Weber Tool Manufacturers in Berlin-Tempelhof.

The object is to rationalise completely the industries concerned and to ensure better use of the available machinery and man power.

From Riom

IN the course of the trial which is to help the Vichy rulers to whitewash their reputation before the public, interesting and sad facts have been revealed. The tragic state of affairs in pre-war France is exposed in the evidence of all witnesses and "accused."

M. Guy la Chambre, Air Minister at the outbreak of war, stated that before war broke out aircraft production amounted to 35 machines per month and rose to 300 during the first month of war. Only about 50 bombers existed when mobilisation was ordered. He acccused the French High Command, which "did not digest the lessons of the Polish campaign and did not provide for planes of this type."



TEUTONIC THOROUGHNESS: German submarine slipways being covered by huge slabs of ferro-concrete to render them bomb-proof.

At the same time the hesitation of the military command about priorities and their lack of appreciation of the possibility of the employment of aircraft against tanks further contributed to the chaotic state of France's air power.

Towed Giant

A NEW German transport glider, "The Giant," is reported to have been completed recently. The glider is said to have a wing-span of 120ft. and is towed by three machines. It can carry 150 fully armed men or heavy cargo!

From Occupied France

SCREENING behind the shield of a purely military occupation, the Germans have found the French industrial power and resources, such as bauxite and aluminium, a welcome addition to their war effort. Undoubtedly some French manufacturers had to be coerced into this co-operation with the Nazis, but others whose names have become so prominent in the Riom trial have apparently jumped at the opportunity of profit.

The extent of this collaboration is best shown by the financial results of several leading French aircraft firms in the past year. Thus Avions Salmson of Billancourt (engine and aircraft manufacturers) paid a 7 per cent. ordinary dividend for the first time since 1930. The Schneider-Creusot sold their Central and Eastern European interests to the German Government and paid a 20 per cent. dividend. The Gnome-Rhône Company of Paris, Limoges, etc., considerably increased its nominal capital, and in 1940 and 1941 registered substantial profits. The S.A. des Moteurs Pour l'Aviation Renault, which controls S.A. des Avions Caudron, doubled its capital.

Since civil aviation is more or less dormant in France these facts suggest the source of the new prosperity of the French aircraft industry.

A French Fighter

THE completion of a new fighter designated 40 C.2 and equipped with a Hispano 12Y cannon engine is reported from France. No details of the performance of the fighter are available; the 12Y engine is rated at 1,100 h.p. at 11,000ft., and at 2,400 r.p.m. It has a 20 mm. quick-firing gun mounted on the upper half of the crankcase in the angle between the cylinders. The right-hand auxiliary drive shaft is provided with a gun-synchronising drive and additional machine guns firing through the airscrew disc may be installed.

Hispano-Suiza

THIS company, which operates both in Occupied and Unoccupied France, has developed a new type of engine, the 12Z. This model is very similar to the 12Y 12-cylinder liquid-cooled, but has four valves per cylinder instead of two on the 12Y; these valves open simultaneously at the end of the exhaust stroke to provide fresh-air scavenging. Power output rated at 1,200 h.p. at 2,600 r.p.m.; maximum power 1,500 h.p. for periods of not more than 5 min. Fuel of 100 octane, but this engine is being adopted for operation with 87 octane fuel as well.

The power output is ultimately to be stepped up to about 2,000 h.p.

Thirtieth of the Second Series

FRIEND or FOE ?

Italian Three-engined Bombers: S.M.79 and CANT Z1007bis

THE Savoia Marchetti 79 is an older design than the CANT Z1007bis, which has replaced it, or partially replaced it, in a number of squadrons of the *Regia Aeronautica*.

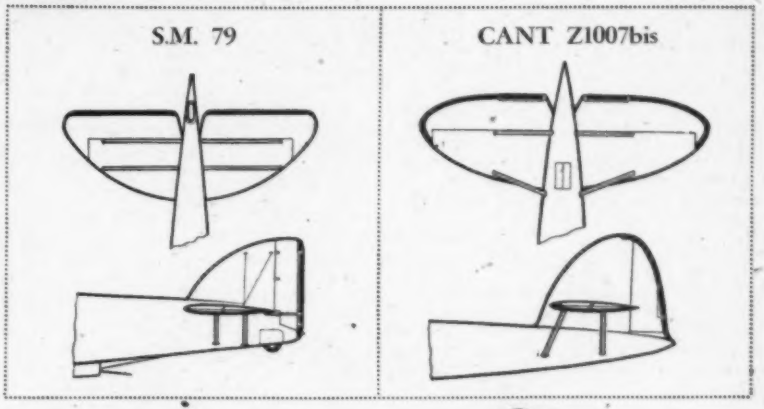
SAVOIA MARCHETTI 79: Distinctive fin and rudder with curved leading-edge and straight vertical trailing-edge. Semi-circular strut-braced tailplane.

But there are still a good many of the former in service, and both types are likely to be encountered in any theatre of war where the Italian air force is operating.

Both aircraft are in the heavy bomber class. The CANT represents the latest type to go into operational service and is probably the best all-round bomber Italy possesses, and those based in Italy are used mainly for attacks on Allied shipping in the Mediterranean.

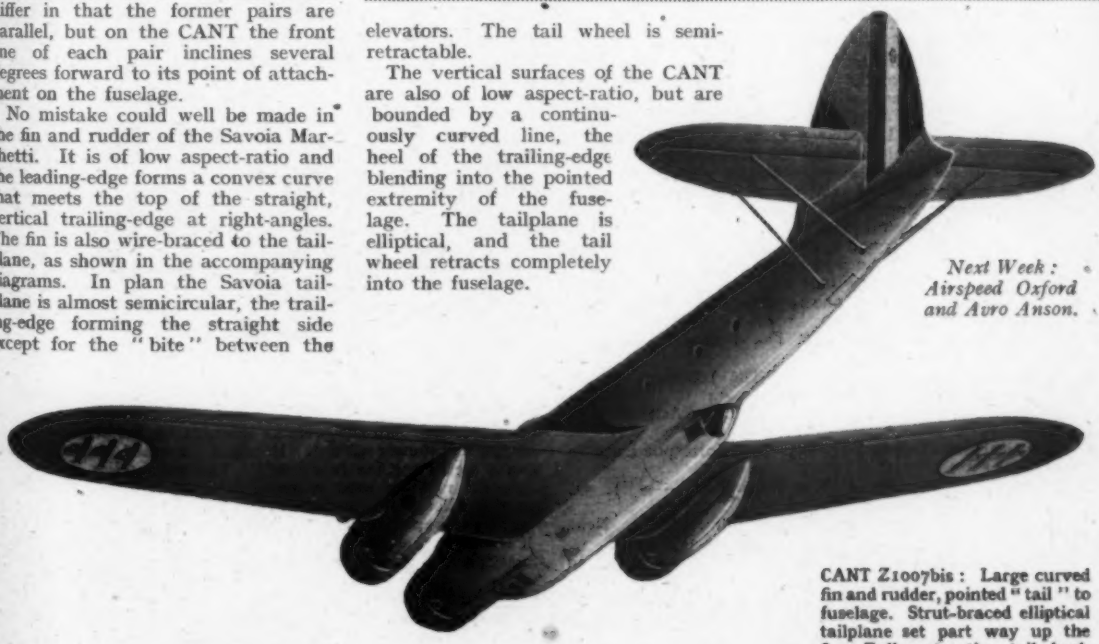
The tailplanes of both machines are externally braced by double struts, but whereas that of the Savoia is mounted level with the base of the fin, the CANT tailplane is set part way up the fin. The struts themselves also differ in that the former pairs are parallel, but on the CANT the front one of each pair inclines several degrees forward to its point of attachment on the fuselage.

No mistake could well be made in the fin and rudder of the Savoia Marchetti. It is of low aspect-ratio and the leading-edge forms a convex curve that meets the top of the straight, vertical trailing-edge at right-angles. The fin is also wire-braced to the tailplane, as shown in the accompanying diagrams. In plan the Savoia tailplane is almost semicircular, the trailing-edge forming the straight side except for the "bite" between the elevators. The tail wheel is semi-retractable.



The vertical surfaces of the CANT are also of low aspect-ratio, but are bounded by a continuously curved line, the heel of the trailing-edge blending into the pointed extremity of the fuselage. The tailplane is elliptical, and the tail wheel retracts completely into the fuselage.

Next Week: Airspeed Oxford and Avro Anson.



CANT Z1007bis: Large curved fin and rudder, pointed "tail" to fuselage. Strut-braced elliptical tailplane set part way up the fin. Fully retracting tailwheel.

Correspondence

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

NO NATIONAL MONOPOLY

Exaggerated Claims are Bad Policy

THE recent letter in *Flight* on the subject of American publicity for their bombers and fighters is a very timely one. There must be many people here who, owing to their lack of knowledge of aeronautical affairs, believe this high-pressure American publicity.

The worst offenders are the daily newspapers, which often print aeronautical "news" of the most inaccurate and ridiculous kind without, apparently, submitting it to their aeronautical correspondent for his comments before publication. (Even *Flight* sometimes passes exaggerated claims for American aircraft without comment; see my letter in the issue of June 5th, 1941.) Lord Beaverbrook's broadcast, at the end of 1940, in which he declared that the Curtiss P.40 was equivalent in performance and speed to the Spitfire (figures released later on showed that the Tomahawk was not nearly as fast as the Spitfire) is another example of the kind of statement which does no good to anyone and is unfair to the British industry.

The Flying Fortress I is the classic example of American propaganda run wild. This aircraft, with no power-operated turrets, is far less of a flying fortress than our old Wellingtons and Whitleys; yet it received the most exaggerated praise from the Press.

Gross over-praising of American aircraft, or ours for that matter, does no good to us or the United States, and it lays us open to the jeering derision of our enemies who soon find out the true worth of the aircraft opposed to them.

The R.A.F. need and deserve the very best machines we can give them; and to expect them to fly aircraft which are inferior to our own is not only unfair to them but is bad policy. But we shall not get better operational aircraft from the United States by extravagant praise of those already delivered.

The Anglo-American war effort is a matter of life and death, not a mutual admiration society The fact that our greater experience of air warfare enables us to offer more constructive criticism of American aircraft than they can give to ours should not deter us from asking for machines more worthy of the men who have to fly them.

E. N. B. BENTLEY,
A.F.R.Ae.S.

LUNAR SPACE VESSEL

Vertical Escape from the Earth

AS might be expected, there is not complete agreement among the members of the British Interplanetary Society, but I shall content myself with differing from Mr. R. A. Smith's recent article in *Flight* on one point only—the vertical escape from the earth. I favour a more gentle acceleration around the earth's circumference, in the stratosphere, in which case the take-off becomes a simpler matter with the aid of fins, which can also start the axial rotation during the initial flight, and may be jettisoned.

Some time before the war the B.I.S. had an arrangement with its American and German counterparts whereby all three journals were sent out to the members of each. To the best of my knowledge there are now four such societies in England, but one doubts if the German one survived the "purges"!

They are as follows:—

British Interplanetary Society ("The Journal of ——") (dispersed on National Service).

Manchester Interplanetary Society ("The Astronaut"), 41, Longford Place, Victoria Park, Manchester, 14.

Manchester Astronautical Association, 683, Ashton New Road, Manchester, 11.

Astronautical Development Society (see Correspondence in *Flight*, October 30th, 1941).

American Rocket Society ("The Journal of ——"), 31, West 86th Street, New York City.

E. V. Fortschrittliche Verkehrstechnik ("Das Neue Fahrzeug"), Berlin, S.W.29, Bergmannstrasse 51.

It would be a good thing if *Flight* were instrumental in bringing about more co-operation.

Finally, I should like to draw attention to the following note which appeared after a letter printed in *Flight* July 25th, 1935:—

[A member of the staff of *Flight* has watched a demonstration of Mr. Verschoyle's apparatus. He reports that there is no doubt whatever that the "levitors"—which are small paper cylinders containing simple electrical apparatus—do rise in the air when the potential is applied to them by the thin wire, which they actually tend to lift also. The experiments appear to be convincing, though probably of more interest to the electrical engineer than to the aeronautical engineer at the present stage of progress.—ED.]

I think I can say on behalf of all interested in Space Travel that the hospitality accorded by *Flight* is exceedingly appreciated.

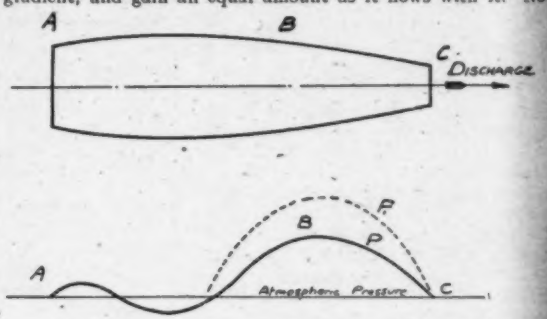
R. C. ABEL.

JET PROPULSION OF AIRCRAFT

Pressure Variation "See-Saw"

MAY I draw your attention to what I consider to be a fundamental objection to any scheme of jet propulsion of aircraft, in which the object is to increase the momentum of a jet of air by introducing heat energy into it, by fuel jets or burners?

When air is flowing through any system or arrangements of pipes, nozzles or jets, there will generally be, by Bernouilli's theorem, a variation of pressure along the line of flow. The air will lose momentum as it flows against the pressure gradient, and gain an equal amount as it flows with it. No



P = Pressure distribution. No heat added.
P' = " " Heat added.

matter how complicated the system of pipes, etc., there can be no resultant gain in momentum.

Suppose now that heat is added at B in the accompanying diagram. This will produce an increase in the temperature and the pressure, both increases being due to an increase in the *random* molecular energy of the air. There will be no change in the general momentum. The change in pressure due to the addition of heat will modify the pressure distribution, inside the jet propulsion apparatus, as shown.

In travelling down the pressure gradient from B to C the air will undoubtedly gain momentum, but, on the other hand, it will lose an equal amount in travelling up the gradient from A to B. The whole idea appears to me to be analogous to an attempt to propel a vehicle by placing hills in its path in the hope that the momentum gained coming down the hill will more than offset the momentum lost in climbing it.

The only air jets I can imagine functioning satisfactorily are those fed by an airscrew or air compressor, in which cases the air is "lifted" up the pressure gradient by the airscrew blade or the compressor piston. It might be asked, "How, then, can a steam turbine function?" The answer lies in the fact that the medium used is forced into the boiler (up the pressure gradient) in a concentrated form (i.e., liquid) and used as a propellant in a highly expanded or gaseous condition. If there is an error in my reasoning or any points that I have overlooked I would appreciate enlightenment.

R. M. HELSDON, B.Sc.

[If the conclusions of our correspondent mean that, in his view, propulsion by jet reaction is not feasible, the actual flight of the Caproni Campini aircraft is sufficient answer.—ED.]

FINE ART PRINTS IN FULL COLOUR OF FRANK WOOTTON'S FAMOUS PAINTINGS

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IN response to many requests the Airscrew Division of The de Havilland Aircraft Co., Ltd., has arranged for the production of a limited edition of fine art prints in the artist's true colourings of a series of six oil paintings by Frank Wootton which now hang at the Headquarters of Fighter, Bomber and Coastal Commands. These prints are to be sold for the sole benefit of the R.A.F. Benevolent Fund, and the series comprises :

1. NIGHT WORK—Hurricanes in 1940.
2. A JOB OF WORK TO BE DONE—Defiants en route to Dunkirk, May, 1940.
3. LOOKING FOR TROUBLE—Spitfires in the Battle of Britain.
4. SUNDERLANDS ON CONVOY PATROL.
5. OVER THE TARGET—Weather favours the Blenheims.
6. LEAVING FOR THE PARTY—Wellingtons taking-off at dusk.

Each print measures approximately 17 ins. x 12 ins.

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A very small number of artist-signed proofs is also available.

Single copies of any subject	£2 2s. 0d. post free
Set of six	£10 10s. 0d. post free

NOTE—50% of the purchase price is given immediately to the R.A.F. Benevolent Fund and of the remainder, after actual cost of printing and distribution has been recovered, the balance will, in addition, be handed over to the Fund.

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HERE AND THERE

Royal Air Force Club

THE annual general meeting of the Royal Air Force Club, 128, Piccadilly, W.1, will be held on Wednesday, March 25th. The meeting begins at 6 p.m.

Mr. R. N. Duke's New Post

THE Secretary of State for Air, Sir Archibald Sinclair, with the approval of the Prime Minister, has appointed Mr. Robert Norman Duke, C.B., D.S.O., M.C., to be an additional Deputy Under-Secretary of State in the Air Ministry with effect from March 16th, 1942.

Mr. Duke is Secretary of the Scottish Home Department and has been acting as Principal Officer in the Scottish Civil Defence Regional Office.

W.A.A.F. Hairdressers

THE W.A.A.F., at some stations, will in future have their own hairdressers.

This new "trade" has been established to maintain the standard of smartness and hygiene in the Service, and to overcome the difficulty experienced by airwomen serving on R.A.F. stations some distance from the nearest town or village in visiting a civilian hairdresser.

"Malice in Wonderland"

LITERARY skill is frequently "born to blush unseen"—or hide its efforts in the service magazine!

At all events, *Flight* has lately received a copy of the Christmas number of *The Woodpecker*, the chirpy little "house organ" of the Port Elizabeth Air Station.

Among a good deal of verbal fun—much of which will obviously mean little to anyone not resident on the said air station—there is a cleverly written burlesque pantomime entitled "Malice in Wonderland" (by Willy and John, whoever they may be!) which ought to be a riot of a show to stage if only because it brings down the (fire) curtain with the King, Prince, Princess and sundry Nubians engulfed in the foam from a chemical fire-extinguisher.

Maybe this will give Nervo and Knox a new idea!

Colour Prints

THOSE who are interested in acquiring reproductions of pictures depicting British aircraft in action will like to know that several examples of the work of Roy Nockolds, recognised as one of our foremost artists, are being reproduced in a series of colour prints by Frost and Reed, Ltd.

These are being issued in three different states ranging in price from 23s. to £4 17s. 6d., and include a limited number of signed artist's proofs, and a percentage of the proceeds from their sale will go to the Royal Air Force Benevolent Fund.

Flight has received an example of one of these prints, "Eyes of the Convoy," depicting a Sunderland in a sea and sky setting, and both its artistic merit and quality of reproduction are excellent.

New Portrait of the King

A NEW photograph of The King, showing His Majesty in his R.A.F. uniform, has lately been taken and is being made available to Air Force stations. It is customary, and the natural wish of the officers, to have portraits of Their Majesties, as heads of the R.A.F. and W.A.A.F., hung in station messes.

The King is a Marshal of the Royal Air Force, and Air Commodore-in-Chief of the Auxiliary Air Force. He learned to fly in 1919 and since then has worn the R.A.F. wings. Her Majesty is Commandant-in-Chief of the W.A.A.F.

Boulton Paul's New Chairman

MR. ROBERT GORDON SIMPSON, M.C., C.A., has been elected a director and Chairman of Boulton Paul Aircraft, Ltd.

Mr. Simpson, who is on the boards of numerous Investment Trusts, is Chairman of Smethwick Drop Forgings, Ltd. He is a member of the committee which, under Sir William Beveridge, has been enquiring into the use of skilled men in the Services.

"Engliski Aeroplanski"

"ENGLISKI Aeroplanski" means nothing, either in English or Russian, but it meant a lot to the telephone operator in a village near the Northern Russian front where the R.A.F. Wing was operating for some time.

This operator was a Russian blonde named Anya. When first she heard English voices speaking into the 'phone, she was thrown into confusion. She knew no English. The British, with the exception of three Russian-speaking officers, knew no Russian.

But R.A.F. lorry drivers, who got snowed up, or who drove into drifts in the darkness, had to find some way of communicating with their headquarters.

Feeling that adding "ski" to any word made it sound Russian, they improvised the phrase "Engliski Aeroplanski" when they picked up a telephone; and soon that phrase meant to Anya that the speaker wished to communicate with the headquarters of No. 151 Wing, R.A.F.

Safety in Curves

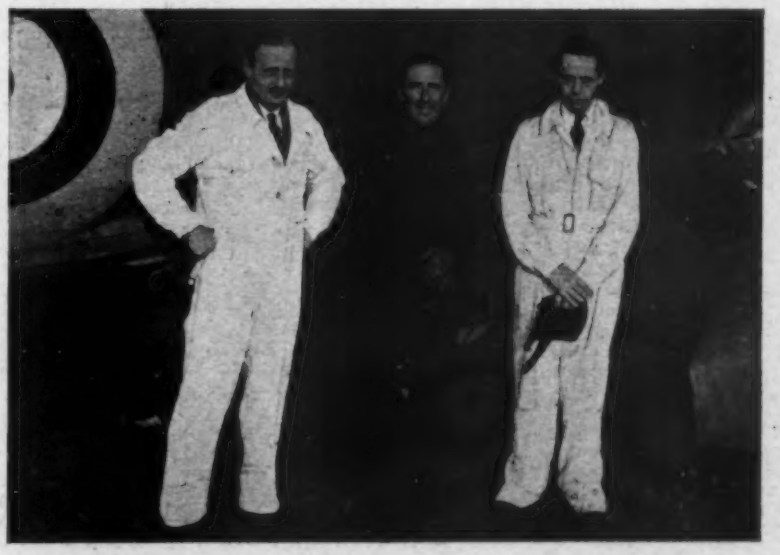
EXPERIMENTS with a new transparent plastic material produced by a Philadelphian physicist, Dr. Willard F. Bartoe, are reported to have shown that curved sections do not shatter when pierced by bullets, although flat ones, subjected to identical treatment, do shatter.

Dr. Bartoe's firm was asked to produce a transparent plastic material for aircraft flying at 40,000ft. and above, and the tests were carried out with panels from one-half to three-quarters of an inch thick and under air pressure simulating pressure-cockpit conditions. When flat, they shattered, but when bent into curved domes the bullets made clean holes of small diameter, some of which proved to be self-healing!

Death of Mr. F. J. Selby

WE regret to announce the death, at the age of 74, of Mr. F. J. Selby, C.B.E., M.A., who was for 14 years secretary of the National Physical Laboratory, and who retired from that office in 1932.

Mr. Selby joined the staff of the Laboratory in 1903 and became its secretary in 1918, and from 1909 until 1919 he was secretary of the Advisory Committee for Aeronautics.



SOME WESTLAND TEST PILOTS: (Left to right) J. H. H. Hill, who is in charge of production testing; H. J. Penrose, chief test pilot, and J. Ramsden, who assists with the flying of prototypes. It was the latter two pilots who co-operated in providing *Flight* with the Whirlwind pictures published on March 5th.

CIVIL AVIATION

Strong Criticism by Two M.P.s in Commons Debate : Air Ministry Officials Accused of Ineptitude and Neglect : Demand for Prompt and Bold Planning

OUTSPOKEN criticism of the Government's handling of civil aviation in the past, and strongly worded doubts of the value of present plans, were expressed by Mrs. Tate, Conservative Member for Frome, when she moved an amendment during the debate on the Air Estimates.

She was valiantly supported by Wing Cdr. Wright (Erdington Division of Birmingham), who seconded her amendment, and after Capt. H. Balfour (Joint Under-Secretary of State for Air) had replied, Mrs. Tate said:

"In accordance with tradition, but with no feeling whatever of confidence or satisfaction, I beg to ask leave to withdraw the amendment."

The honourable lady rose to her feet when, at the close of the debate, the usual question was proposed, "That Mr. Speaker do now leave the chair." Her proposed amendment read, "That this House, appreciating the handicap placed upon this country during the war through lack of vision in the pre-war development of British civil aviation, and realising how vitally Empire unity, trade and prosperity will depend upon rapid and efficient establishment of air communications upon the cessation of hostilities, urges His Majesty's Government to set up a small independent committee to consult with the Dominions and Allied countries and to prepare a scheme for post-war planning of aerial transport."

Grave Criticisms

Stressing the vital importance of the immediate consideration of civil aviation, Mrs. Tate said that the criticisms she had to make, which were many and of an exceedingly grave character, referred to those officials in the Air Ministry responsible for a policy the only consistent characteristic of which had been neglect. She criticised the Board of British Overseas Airways to a lesser extent, because for them she felt pity rather than anger.

Much of Mrs. Tate's speech was a severely critical survey of the Air Ministry's record in civil aviation before the war, and she proceeded to give examples of "its extraordinary ineptitude." They had allowed the Dutch K.L.M. line to capture immense prestige, trade and air traffic lines in the East; they had failed to establish either the promised air route from Bermuda to New York or the South Atlantic route which, she alleged, "we were promised year after year." Five groups were invited to tender for the South Atlantic route in, she believed, 1936, but by May, 1939, no scheme had been inaugurated, although Germany had been flying the route since 1934 and, in consequence, had doubled her exports to the Argentine by 1938.

On German Advice

Mrs. Tate went on to say that she had been connected with one of the organisations which had tendered for this route, but the scheme they put forward had been turned down because, among other reasons, they had proposed to use diesel engines, and the committee said they knew the diesel engine was no good because the Germans had told them so.

"Only a departmental committee could have put forward such a reason for not examining a thing—that the Germans told them it was no good!"—added Mrs. Tate.

Turning to Great Britain itself, Mrs. Tate said that suppression was the order of the day, and internal air lines were swept from existence except where the influence of the powerful main-line railways could be felt. In short, there was no evidence of forward planning, either at home or abroad, nor was there any sign of appreciation of the vital importance of air lines, and the few examples she had quoted should help the House to judge the incompetence of those officials of the Air Ministry who directed our policy.

The position of civil aviation under present wartime conditions was also examined by Mrs. Tate with uncompromising frankness. Since the Secretary of State for Air had taken over Imperial Airways and British Airways, amalgamated under the name of British Overseas Airways—("a very dull and uninspiring name, even rather a stupid name")—this organisation had fared extraordinarily ill, she said, and she mentioned instances when flying boats from its "tiny fleet, absolutely vital to us," had been taken away and sent on missions for which "anyone who knew their lack of speed and armament knew they would be useless."

"Far More Sinister"

Referring to the arrangement made between the British Government and Pan-American Airways in the Middle East before America came into the war, Mrs. Tate said: "Now I turn to a far more sinister matter. It would be impolite for me to be too specific, but I want to know what influence persuaded the Under-Secretary to follow such an inexplicable policy of appeasement and to mortgage so seriously our future in Africa. What induced the Under-Secretary to foster the interests in Africa of a great competing line, to the disadvantage of the Corporation? Why were our air routes in Africa handed over to the greatest airline in the world; and what did we get in return? I want an answer to that question, and I think the British taxpayer has a right to an answer, considering that he paid about £3,250,000 for the service."

But it was when Mrs. Tate came to speculate upon future prospects that she really permitted herself that freedom of expression only possible on what is legally known as a "privileged occasion." And the full vigour of her attack was directed against Sir Francis Shelmerdine, formerly Director-General of Civil Aviation and, since his retirement, appointed chairman of the inter-departmental committee on civil aviation.

Chairman Criticised

Describing the new committee as "an absolute farce," Mrs. Tate observed: "And who is the chairman? None other than Sir Francis Shelmerdine, who has been so greatly responsible for the catastrophes of the past," and she then went on to indicate, in terms that were anything but complimentary, that in her opinion Sir Francis lacked the necessary qualifications for such a position, but prefixed her remarks with the assurance that she did not wish him any ill.

Concluding with the suggestion that the matter should be studied by an absolutely independent committee, Mrs. Tate said: "We are fighting to build a better Britain, and any degree of Empire unity, progress, prosperity and trade will depend to a terrifying extent upon civil aviation after the war."

No mover of an amendment could have had more wholehearted backing from a seconder than that accorded to Mrs. Tate by Wing Cdr. Wright who, referring immediately to the honourable lady's "very forceful manner," assured the House that she had not over-stated the case. He could, he said, amplify everything she had said and, indeed, add considerably to the list. There was, for example, the "terrible waste of ratepayers' money throughout the country" caused by the lack of proper guidance in the development of municipal airports, and also the "tragic farce of the much-advertised Civil Air Guard." Long

CIVIL AVIATION

years of unfulfilled promises, he said, had evidently led the Air Ministry to believe that the House would swallow any story which would make it at least satisfied.

Wing Cdr. Wright then augmented Mrs. Tate's questions about "the handing over to Pan-American Airways one of the most important routes operated by British Overseas Airways Corporation," namely, the Trans-African route, and he asked if it was not a fact that "this privately owned, purely commercial company has largely utilised the concession granted to them as a means of endeavouring to extend their line of world communications beyond Khartoum, rather than to build up a more frequent and therefore more useful Trans-African service." Suggesting that the agreement had been settled by the Air Ministry without the knowledge of the B.O.A. officials, he wanted to know why it had been made with a selected, privately owned commercial firm in America whose president, Juan Trippe, "has been publicly acknowledged in the United States to be using the war as a golden opportunity to win concessions and to obtain a long lead over his future competitors."

The Urgent Need

Referring to the past as "a sorry story," Wing Cdr. Wright outlined the course which he believed they must take, now and immediately after the war, and he said that the only point on which he differed from Mrs. Tate was that whereas she favoured leaving civil aviation in the hands of the Air Ministry, he thought it was vital that it should be removed without delay from the Air Ministry's clutches.

Saying that much money would have to be spent if this country was going to take its rightful place in the development of the new mercantile air service, Wing Cdr. Wright stressed the need for "bold men of vision."

"What is needed is the right plans now," he said, "and, as a logical sequence, the right men to make and implement those plans.

"We must buy the best equipment, even if it is not British. We must provide the best possible navigational aids. Our services must fly by day and night as the ship sails and the railway train runs. We must have perfect airports and hotels which give real comfort and even luxury. They must compare with our best hotels and not our railway refreshment bars and waiting-rooms. Our aircraft must provide every possible comfort, for flying is a tiring means of travel. We must think in terms of flights of 5,000 miles non-stop at heights of 30,000ft. and at speeds of 300 m.p.h. We must not be afraid to scrap and replace obsolescent types of aircraft and equipment.

"We must remember that air transport in the future will no longer be for the wealthy alone—if there are any wealthy. Because of the time it saves it will soon become the poor man's means of travel. It is subject to the same economic laws that govern all costs—the greater the quantity the cheaper the cost. We must offer the facilities at the right price and the traffic will be there. Air travel will open up something never before attainable to the ordinary man in the street. It will revolutionise his outlook through closer contact with foreign countries.

Two-phase Planning

The Wing Commander went on to say that the planning would have to be in two phases: the immediate post-war phase of improvisation with converted bombers and the second phase of natural evolution from the first, and bringing into use as soon as possible new types of luxury air-liners and attendant amenities, and the establishment of training schools for pilots and personnel. All this could not be brought about by leaving it in the inept hands of those who had failed so miserably in the past, and we wanted at once—the matter brooked no delay—a small independent committee under an unbiased chairman.

"Hard things have been said about the late Director of Civil Aviation," went on the Wing Commander, "but I would not spare him, for he has failed, and failed badly, judged by commercial standards——" and he gave his opinion that Sir Francis had not failed in the eyes of the Air Ministry because he had been "the perfect no-trouble 'Yes-man,'" and he referred to sighs of relief being turned to gasps of horror when the retiring Director had been put in a position where he could seriously cramp the style of his successor.

Equal frankness was forthcoming from Captain Balfour when he rose to reply. "I should like to congratulate the honourable lady on her interesting speech," he said, "which dealt mainly with the past and which was as full of force as it was of inaccuracy, and was as full of statement as it was empty of fact."

Tribute to B.O.A.

He did not think present air communications in wartime were suffering from quite such a disadvantage as Mrs. Tate would have them believe. He paid a tribute to the employees of British Overseas Airways, which had done, and still was doing, splendid work in maintaining important overseas air communications. In 1940 they had flown 5,500,000 miles in aid of the war effort; there was an increase in 1941, and this year the figure would be about 8,000,000 miles, but he could not give details of routes or equipment. There were also other questions put by Mrs. Tate and Wing Cdr. Wright which he must not answer "in the interests of security."

On the subject of the African route, however, Capt. Balfour said that Mrs. Tate had not been accurate. The decision taken was not to hand over B.O.A. routes to a private enterprise in America. The President of the United States had offered co-operation and help, and had directed the U.S. Army Air Corps to tell Pan-American to drive an additional highway across Africa, and we had gained materially from those facilities.

Mrs. Tate here interposed a question about mails, to which Capt. Balfour replied that Pan-American did not carry American mail across Africa, but had concentrated on carrying our military requirements; one hundred per cent. of the load capacity was devoted to war effort purposes; the American company had not been carrying commercial traffic. Capt. Balfour also intimated that B.O.A. had been aware of the agreement, and that there need be no fear of post-war difficulties, since, by mutual agreement, the arrangement would terminate at the end of hostilities.

The Under-Secretary of State for Air said he agreed with Wing Cdr. Wright's brief sketch as to how we should have to approach the post-war position, but he regretted the terms used in reference to Sir Francis Shelmerdine, who had done great work in many directions.

Postcard Size Photographs

TO the series of *Flight* picture cards, which are actual photographs of aircraft used in the R.A.F. and Fleet Air Arm, the following additions have recently been made:

Short Stirling	Avro Manchester
Lockheed Venture	Vultee Vanguard
Curtiss Kittyhawk	Consolidated Liberator
Brewster Bermuda	North American Mustang
Westland Whirlwind	

These cards are obtainable at fourpence each post free, or in batches of one dozen or more, at threepence each, from *Flight* publishing offices, Dorset House, Stamford Street, London, S.E.1.

WORLD PRESS SUMMARY

RÉSUMÉ OF TECHNICAL ARTICLES DEALING WITH AIRCRAFT AND ASSOCIATED SUBJECTS

For the summaries and translations from aircraft and technical journals of the world, we are indebted to the Directorate of Scientific Research and Technical Development, Ministry of Aircraft Production.

High-speed Jumps

IF a parachutist opens his parachute whilst travelling through the air at a speed in excess of 250 km/h, the normal parachute is likely to burst. It is therefore necessary to delay the opening until the rate of descent has dropped to 65 m/sec.

The author calculates the trajectory of the human body for a series of initial values of the speed 100 to 250 m/sec. and four positions of the original tangent to the trajectory (0°, −30°, −60°, and −90°), on the assumption that the terminal velocity of a free drop is 61 m/sec. and the weight of body is 90 kg. From this he deduces the minimum delay time for the opening and the minimum altitude from which a jump can take place. If, for example, the pilot leaves a fighter aircraft flying horizontally at 540 km/h, the delay time is 3.7 sec. and the minimum altitude 115 m. If diving vertically at 720 km/h, the delay time becomes 8.9 sec. and the minimum altitude 920 m. Cases may arise where the pilot is forced to leave the aircraft at altitudes below the minimum value for the initial speed conditions. The full delay time is now obviously out of the question, but he may escape with his life if he waits with the opening till about 150 m. from the ground. This will require great presence of mind and at the same time an accurate eye for ground clearance. The latter quality can be trained.

Parachute Jumps from High Speed Aircraft.—(E. Muhlemann, *Flugwehr und Technik*.) (Switzerland.)

Joining Air Film

IN the practical evaluation of aerial reconnaissance material it is frequently necessary to deal with short-length aero-films, usually those from the " AFA—I " aerial camera.

The length of such films does not exceed 9 metres, and they are developed in apparatus designed for handling films of 28-30 metres in length, taking from 30 to 35 minutes for the operation. Consequently, if the laboratory receives three to six such films, it will require one and a half to three hours to deal with them. Furthermore, the utilisation of the apparatus will be one-third only of the designed capacity, and the consumption of solutions and chemicals will be correspondingly excessive.

The most economical method of treating such short films is, therefore, to handle a number of them simultaneously by gluing them together into one strip.

The gluing is performed in the following manner: Using a brush or a tuft of cotton wool, ordinary dope is applied to the emulsion side of the aero-film (about 4-5 cm. wide). Before the adhesive dries, the section to be joined on is applied with the gelatine side to the glued section, and rubbed down with a clean rag until the adhesive has dried. This method is reliable, the glued film does not tear when passed through the standard Air Force developing appliance, nor dissolves in the liquids used in the treatment of negatives: de-sensitiser, water, developer, fixing bath, or alcohol.

A Device for Joining Short Lengths of Aerial Photo-films.—(K. N. Sakharov, *Air Fleet News*.) (U.S.S.R.)

Night Error

THIS paper describes the development of a method enabling pilots to determine the accuracy of night bearings obtained by means of a radio compass in the wavelength range of 200 to 2,000 metres (150 to 1,500 kilocycles), and the effect on the indication when the aircraft passes through the combination of fields due to the reflection of waves from the E layer or from a mountain side. Consideration is given to the appearance of the night error on the ground and in altitude, taking into account the simultaneous presence of the direct wave, the sky wave and the sky wave reflected from the ground. It is demonstrated that the night error is smaller in the air than on the ground; also that there are regions in the atmosphere where the night error is very small.

The dynamic aspect of the night error is then studied in the case of an aircraft moving through the above-mentioned system of waves. How the radio-compass indication changes regularly about a mean value, whether correct or not, according to the polarisation of the sky wave, is next discussed. All cases of polarisation are examined.

In conclusion, a number of rules are formulated relative to night direction finding on board aircraft above land or sea, supplemented by maps showing areas where direction finding is safe, unsafe or dangerous. The maps show that the practical range of night direction finding is increased substantially by the correct interpretation of the radio-compass indications.

Control of Night Error in Aeroplane Direction Finding.—(H. Busignies, *Procs. of I.R.E.*) (U.S.A.)

Petrol Poisoning

TWO recent instances of poisoning by petrol fumes in flight are described. Both refer to two-seater bombers with open cockpits. In one case the pipe line between fuel tank and engine fractured; in the second, the nipple on the fuel pressure gauge became unscrewed. In neither case did the defect reveal itself as a petrol spray or splash and the smell in the cockpit was not unduly marked. Nevertheless, the broken pipe led to both pilot and observer ultimately losing consciousness and being injured in the subsequent crash. The consequences of the unscrewed nipple were not so serious, since the pilot landed soon after the smell became noticed. The landing was, however, very rough and the handling of the aircraft much below the standard for this pilot. The latter, however, seems to have been unaware of this.

It must consequently be assumed that in both cases petrol poisoning in flight took place, owing to leakage and an accumulation of highly concentrated fuel fumes in the cockpit. The handbook description of petrol-fume poisoning states: " Light cases of petrol or paraffin poisoning are manifested in the form of a light intoxication. The symptoms are hallucinations of short duration. In serious cases, reduced pulse with irregular breathing, contracted or dilated pupils, foam on the lips, cutaneous hæmorrhage, and loss of consciousness." Loewe, Kolesnikov (Baku) and Lazarev (Leningrad) found, by experiments on animals, that aviation spirit (pure) is a heart toxic. Excitation reactions are poorly developed. Insensibility results from a concentration of 0.05 (grammes?) per cubic metre after 4-5 hours.

Since doped petrol was used in the above cases, the question arises whether poisoning was due to the petrol or the added tetra-ethyl lead. Acute tetra-ethyl lead poisoning, according to the instructions for its use, is distinguished by the following symptoms: insomnia, extreme excitation, visual and aural hallucination, delirium, talkativeness, insecure gait. In light cases, insomnia, nightmare, sickness, bad taste in the mouth, giddiness, headache, general lassitude. Characteristic for tetra-ethyl lead poisoning is a dormant form lasting several days.

The official handbook states that, owing to the small percentage of addition, poisoning with doped petrol is hardly distinguishable from the effects of pure petrol.

Comparing these descriptions of symptoms with the two cases quoted above, it may be concluded that, even if the dope participated in the effect, the principal poisoning was by means of petrol. Neither did tetra-ethyl lead poisoning appear later.

Conclusions.—(1) Acute poisoning by the fuel, in case of leakage in flight, is possible even in an open cockpit. (2) In both cases mentioned the poisoning manifested itself as rapid insensibility of a light nature, after a short previous excitation.

Cases of Petrol Poisoning in Flight.—(P. F. Vokhmyani, *Air Fleet News*.) (U.S.S.R.)

The NORWEGIAN AIR FORCE in ICELAND

Some Photographs Showing the Difficult Conditions Under Which a Naval Squadron of the Royal Norwegian Air Force Performs Its Everyday Work

1) A pilot of the Royal Norwegian Air Force at the controls of his Northrop N.P.3. In the foreground is the D.F. loop aerial.
2) Clearing snow from the wings. Despite the severe weather the machines are kept in the open.
3) A formation of N.P.3's in echelon to the left.
4) The squadron is a naval unit. A ship's bell announces the time of day.
5) Armourers drawing bombs from store. From their shape the bombs appear to be of American design and manufacture.
6) Cleaning the two rifle - calibre Brownings in the starboard wing of a Northrop seaplane.
7) A Norwegian seaplane on what passes for a slipway in Iceland.

War in the Air

DIRECT HITS : The opening bursts in the daylight attack by Bomber Command Bostons on the Matford lorry factory at Poissy.

The Fight for New Guinea : Great Work by the R.A.A.F. : The "Tirpitz" Attacked with Torpedoes : U.S. Fleet Repels Air Attack

ALTHOUGH the R.A.F. and the American Volunteer Group inflicted such very heavy casualties on the Japanese aircraft in Burma, it appears from later reports that the enemy actually outnumbered them in the air. This, however, does not seem to have been the cause of the British evacuation of Rangoon. That was due to the Japanese command of the sea and their consequent ability to land enough troops to outmatch the stubborn Indian defenders. It is a change, and really almost a relief, not to have to repeat that our latest reverse was once again due to shortage of aircraft.

Such a shortage did play a very important part in the failure of the really heroic Dutch to hold the line which guarded Bandoeng. Their troops were subjected to such incessant dive-bombing and low-level bombing that they were worn out. Though the defence line was broken, the remainder of the Dutch forces retired into the hilly districts and continued to fight on. The great naval base of Surabaya, at the eastern extremity of Java, has also fallen into Japanese hands, but before leaving the Dutch so wrecked the place that it will be of no use to the enemy for many months to come. Its loss is, none the less, a heavy blow to the United Nations.

The practical elimination of effective Dutch resistance in the East Indies (and how gallant that resistance has been!) brings the threat to Australia much nearer. The Japanese have been concentrating forces in New Guinea, which is the obvious jumping-off place for attacks on the Commonwealth, and have been repeatedly bombing Port Moresby. The Royal Australian Air Force has been hitting back with vigour, and is full of the offensive spirit. Its bombers have been scoring considerable successes on the enemy transports and their naval escorts at and near Rabaul. American bombers have shared in

RESCUE OF A BEAUFORT'S CREW : (Top) The crew of four drifting in their dinghy on the North Sea. (Centre) Winkie the pigeon, which arrived back at its loft after a hundred-mile flight. Winkie had got loose from the pigeon container and started off on its own, while another bird entrusted with a message failed to report. (Bottom) The Air/Sea rescue launch arrived on the scene at speed.

WAR IN THE AIR

the good work. Once more we repeat that every Japanese ship sunk is a loss which the enemy can hardly make good. That loss may not stop the operation which the enemy has in hand, for the Japanese are pushing on regardless of losses and only anxious to grab as much as they can in the shortest possible time. But the strain on their shipping must be immense, and once they begin to suffer reverses they will feel bitterly the loss of every ship, warship or transport, which they are now risking and losing with such an apparently light heart. Soldiers they may be able to afford to sacrifice in large numbers to attain an immediate object, but not so ships.

In the case of New Guinea it is believed that the R.A.A.F. have sunk or crippled all the 13 transports which were bringing Japanese troops to that area.

American Help?

RUMOURS have been growing that at last strong American forces are on their way to the Western Pacific. Their nature has naturally not been disclosed, but some American newspapers have concluded that a United States battle fleet is now searching for the Japanese battle fleet, and that the latter is trying to avoid an action. That that would happen before long has been repeatedly forecast in these articles. The whole Pacific war now depends on battleships, with, of course, their due escorts of cruisers, destroyers, carriers, and other craft. Once the Japanese battle fleet has been eliminated, it will be a straightforward matter to cut the communications of all these far-flung Japanese expeditions, and without sea communications an invading force on an island or anywhere overseas is doomed. When the great trial of strength comes, we have no doubt that H.M.S. *Duke of York* will play her part in it, and doubtless other British warships, too.

Naturally the Germans want to tie as many British capital ships as possible to the waters round Great Britain, and perhaps that was why the new German battleship *Tirpitz* started to steam northwards up the coast of Norway. Of course, she may have merely had the intention of trying to interfere with convoys on their way to Murmansk, but on the other hand she may have been trying to get loose into the Atlantic, as her late sister the *Bismarck* did. It took a considerable muster of British warships from all quarters to find and deal with the *Bismarck*, and it would obviously be good tactics for the Germans to focus the attention of the Royal Navy on the Atlantic just now, to the exclusion of the Pacific. But the Royal Navy does not ever neglect the Atlantic, and the Pacific has always been regarded (except for the despatch of the unfortunate *Prince of Wales* and *Repulse*) as in the charge of the United States Navy.

Whatever the reason, the *Tirpitz* was seen moving northward up the coast of Norway, and without delay naval aircraft attacked her with torpedoes. She put up a heavy smoke screen and was last seen, withdrawing towards the Norwegian coast.

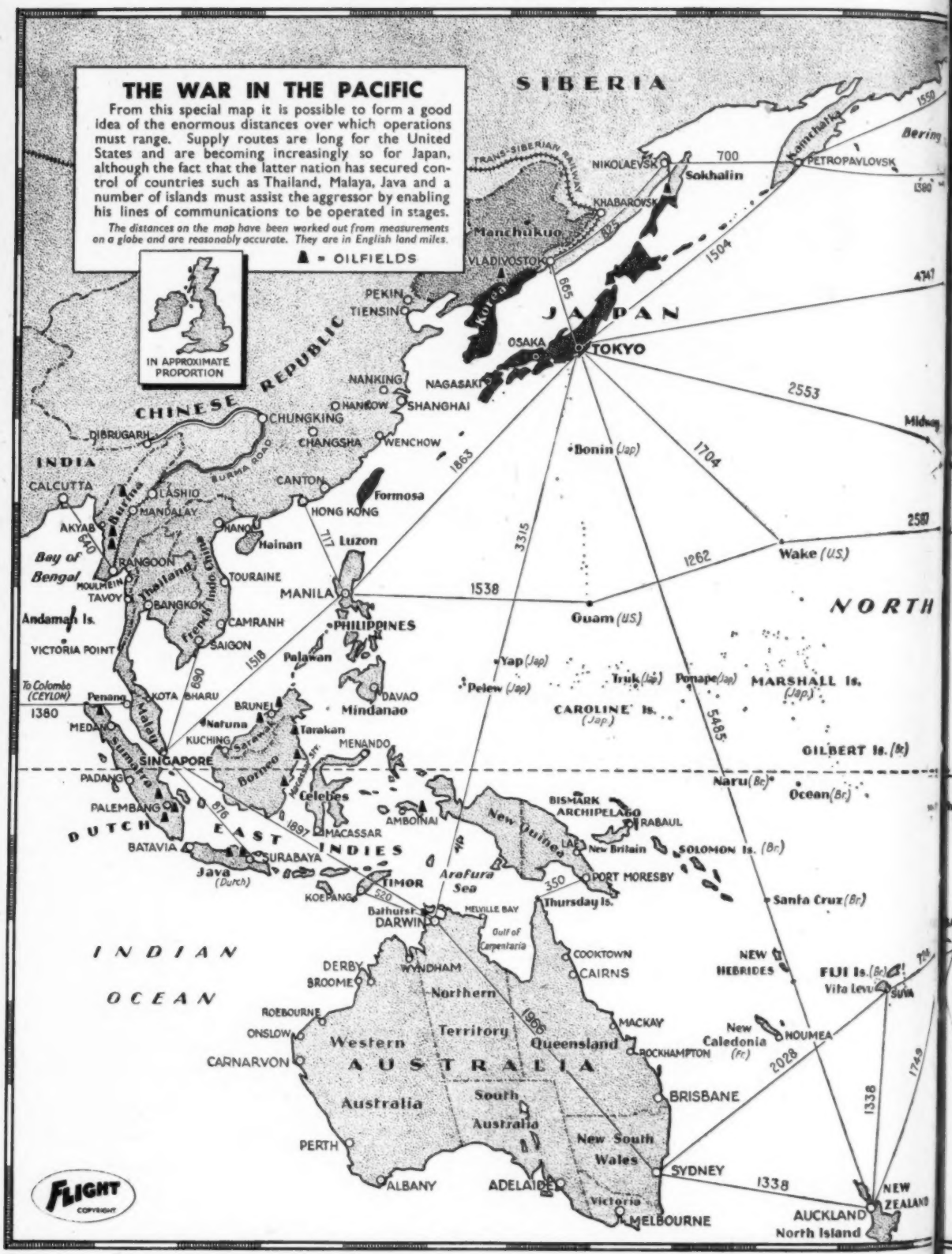
LIBERTY MAN: An air gunner of the Fleet Air Arm "coming ashore" from an Albacore.

AIRY JOTUN: Reich Marshal Goering at a *Luftwaffe* station during his recent visit to Italy.

In the Mediterranean

THE Battle of the Mediterranean goes on with spirit. Whatever its losses, the Axis is determined to reinforce Rommel. Our naval and R.A.F. aircraft are doing all in their power to prevent this, and, of course, submarines are playing their part. One day recently the R.A.F. attacked an enemy convoy in the Central Mediterranean, and their bombs set fire to a cruiser, a destroyer and a merchant vessel. None of our machines was lost. That night naval aircraft took up the attack, and found a heavily laden merchant ship escorted by three Italian destroyers. It was a dark night, so one of our machines dropped flares, to counter which the destroyers put up a smoke screen. Then a torpedo-bomber, or T.S.R. as the Navy calls the class, dived down to 50ft. above the water and released a torpedo from a range of 600 yards. The pilot could not see his torpedo hit the ship, but it was running well when he last saw it. Then later on a second attack was made, and again a smoke screen was put up. This time the pilot came down to 30ft. and was confident that his torpedo hit the merchant ship, which was silhouetted against the smoke screen. Smoke screens are unchancy affairs, and do not always behave as they are meant to do.

In an effort to stop this sort of thing the Axis made a furious assault on the airfields in Malta which lasted continuously for ten days at least. Sometimes 100 enemy aircraft were engaged at the same time. The defences were never mastered, and in the first nine days of March it was reckoned that well over 40 enemy machines were destroyed, damaged or hit. British losses were very small.


THE WAR IN THE PACIFIC
From this special map it is possible to form a good idea of the enormous distances over which operations must range. Supply routes are long for the United States and are becoming increasingly so for Japan, although the fact that the latter nation has secured control of countries such as Thailand, Malaya, Java and a number of islands must assist the aggressor by enabling his lines of communications to be operated in stages.
The distances on the map have been worked out from measurements on a globe and are reasonably accurate. They are in English land miles.
▲ = OILFIELDS
IN APPROXIMATE PROPORTION
SIBERIA
TRANS-SIBERIAN RAILWAY
NIKOLAEVSK
Sakhalin
PETROPAVLOVSK
Kamchatka
Bering
KHABAROVSK
Manchukuo
VLADIVOSTOK
Korea
JAPAN
PEKIN
TIENSIN
OSAKA
TOKYO
NANKING
NAGASAKI
HANKOW
SHANGHAI
CHINESE REPUBLIC
CHUNGKING
CHANGSHA
WENCHOW
DIBRUGARH
INDIA
BURMA ROAD
CANTON
Formosa
CALCUTTA
LASHIO
MANDALAY
HONG KONG
AKYAB
HANOI
Hainan
Luzon
Bay of Bengal
RANGOON
Thailand
French Indo-China
TOURAINE
MANILA
MOULMEIN
TAVOY
BANGKOK
Andaman Is.
CAMRANH
PHILIPPINES
VICTORIA POINT
SAIGON
Palawan
Yap (Jap)
Truk (Jap)
Ponape (Jap)
MARSHALL Is. (Jap.)
Pelew (Jap)
To Colombo (CEYLON)
Penang
KOTA BHARU
DAVAO
Mindanao
1380
BRUNEI
Naruna
CAROLINE Is. (Jap.)
MEDAN
KUCHING
Tarakan
MENANDO
GILBERT Is. (Br.)
SINGAPORE
Malaya
Sumatra
Borneo
Celebes
Naru (Br.)
Ocean (Br.)
PADANG
PALEMBANG
AMBOINAI
BISMARK ARCHIPELAGO
RABAUL
New Guinea
New Britain
SOLOMON Is. (Br.)
DUTCH EAST INDIES
BATAVIA
MACASSAR
SURABAYA
Java (Dutch)
TIMOR
Arafura Sea
PORT MORESBY
KOEPANG
Thursday Is.
Santa Cruz (Br.)
Bathurst
DARWIN
MELVILLE BAY
Gulf of Carpentaria
INDIAN OCEAN
COOKTOWN
CAIRNS
NEW HEBRIDES
FIJI Is. (Br.)
Vita Levu
SUVA
DERBY
WYNDHAM
BROOME
Northern Territory
ROEBOURNE
MACKAY
New Caledonia (Fr.)
NOUMEA
ONSLOW
Western Australia
Queensland
ROCKHAMPTON
CARNARVON
AUSTRALIA
BRISBANE
South Australia
New South Wales
PERTH
SYDNEY
ALBANY
ADELAIDE
Victoria
MELBOURNE
AUCKLAND
North Island
NEW ZEALAND
700
1550
1380
1504
4747
2553
Midway
1320
1863
1704
2580
3315
1262
Wake (U.S.)
1538
Guam (U.S.)
NORTH
PA
717
540
690
1518
1380
5485
876
1897
220
350
1998
2028
1749
1338
1338
FLIGHT
COPYRIGHT

FAIRBANKS
NOME
ALASKA
JUNEAU
Kodiak
SITKA
Hudson Bay
DOMINION OF CANADA
DUTCH HARBOUR
Vancouver Is.
VANCOUVER
SEATTLE
(& Puget Sound)
PORTLAND
MINNEAPOLIS
OTTAWA
QUEBEC
HALIFAX
To Southampton
3400
UNITED STATES
MILWAUKEE
CHICAGO
NEW YORK
SALT LAKE CITY
CHEYENNE
SACRAMENTO
OAKLAND
SAN FRANCISCO
2553
ST. LOUIS
WASHINGTON
OF AMERICA
BURBANK
SANTE FE
MEMPHIS
LOS ANGELES
SAN DIEGO
DALLAS
NEW ORLEANS
2380
2280
2690
2415
1320
HAWAII Is.
MEXICO
Gulf of Mexico
Bahama Is.
HAVANA
Cuba
Jamaica
HONOLULU & Pearl Harbour
Oahu
Hawaii
Johnston (U.S.)
PACIFIC
5244
CENTRAL AMERICA
PANAMA CANAL
BILBAO
6486
Colombia
Ecuador
Peru
LIMA
GALAPAGOS
VALPARAISO
Chile
Argentina
Palmyra (Br.)
2643
EQUATOR
SAMOA Is. (U.S.)
Manua
Tutuila
Phoenix (Br.)
MILES
0 100 200 300 400
U. S. S. R.
VLADIVOSTOK
SAPPORO
AINE
Manchukuo
SEISHIN
TOMINATO
AOMORI
SHINGISHU
HEIJO
DAIREN
PORT ARTHUR
SHINONOMEGAHARA
Japan Sea
Korea
SENDAI
NIIGATA
WEI-HAI-WEI
CHINA
KEIJO
TOYAMA
UYEDA
KIRYU
YAMANASHI
KAGAMIGAHARA
TOKYO
MAIZURU
KINOSAKI
NAGOYA
TOTTORI
MATSUYE
SHIMIZU
SHIMODA
Yellow Sea
TAIKYU
URUSAN
CHINKAI
OSAKA
HAMAMATSU
AKENOHARA
KOBE
FTAMI
FUKUOKA
TACHIARAI
SHIRAHAMA
SASEBO
BEPPU
TOKUSHIMA
OHMURA
KOCHI
KUMAMOTO
SAHEKI
SHANGHAI
KAGOSHIMA
KANAYA
HANG-CHOW
OJIMA
KUMAGAYA
KASUMIGAURA
TOKOROZAWA
TOKYO
TACHIKAWA
OHI
SHIMOSHIZU
TOKYO
YOKOHAMA
KISARAZU
TAIHOKU
GIRAN
TAICHU
KARENKO
KAGI
TAKAO
HEITOGAI
FORMOSA
1290 MILES S.W. OF TOKYO
TATEYAMA
TOKYO
AREA ENLARGED
NAHA
DJM

WAR IN THE AIR

ENEMY AIR LOSSES TO MARCH 14th.

	Over G.B.	Over Continent	Middle East	Far East
March 8	1	2	9	—
" 9	0	6	5	—
" 10	0	0	3	—
" 11	0	0	0	—
" 12	1	0	2	—
" 13	0	8	3	—
" 14	0	10	5	—
	2	26	27	—

Totals: North, 5,684; Middle East, over 3,547; Far East (unofficial), 316.

The R.A.F. on the island has been reinforced, and some Spitfires have arrived there. That caused great excitement among the Maltese, and many declined to take cover but watched to see if they could behold the prowess of the Spitfires. The fighting, however, was too high to come within their vision. We had night fighters up too, and they scored some successes.

THE FACE AT THE WINDOW: The bomb aimer's panel on one of the Douglas D.B.7 fighter-bombers which Fighter Command operates at night against enemy occupied airfields on the Continent.

The Russian Front

THE Germans have been using air transport extensively to help their various bodies of men which have been cut off by the Russians. Food, especially, is being despatched that way. The Red fighters are in the ascendant, and on one day they claimed to have shot down 39 Ju 52 machines in addition to other classes. On the Kalinin front the Russians say that between February 5th and March 8th no less than 277 German aircraft were destroyed in the air or on the ground, as well as lots of tanks and other war material.

The mystery of Air Chief Marshal Sir Richard Peirse's relinquishment of the Bomber Command has been solved by his appearance in Delhi as head of the Air Force in India. He has stated that the Allied Air Forces in Burma are now in a far stronger position than when the campaign opened, and that reinforcements are coming in faster.

The trouble is that land communications between India and Burma are very bad. Aircraft can fly from one country to the other, but heavy equipment has to go by sea, and is liable to interference by Japanese warships. Moreover, most of the Burma ports are in enemy hands.

The Northern Front

THE improved weather of March has led to a renewal of intensive bombing operations against Germany and Occupied France. Two nights' heavy pounding of Essen were stated by the Air Minister to have afflicted that arsenal city worse than the Germans were able to damage Coventry in their notorious raid during the height of the Blitz. Then Cologne had its turn. By day fighter sweeps with contingents of medium bombers down below have damaged factories in France which were working for the enemy. In one of these raids Bostons were used to do the bombing. Last Saturday ten Me 109s were destroyed without any loss or damage to the British fighters, and that made a good ending to a week in which Fighter Command accounted for 26 enemy machines, losing only 12 British fighters.

This week's notes must end with the satisfactory news that substantial American forces have arrived in Australia. They include fighters and dive-bombers, as well as ground crews, and naval and military forces have also reached the South-west Pacific from the United States. Apart from other considerations, the loss of Singapore and Surabaya means that Australia now provides the main base from which the United Nations can strike back at the Japanese, and the High Command of the United States is quite alive to that fact. The British Navy is fully extended in other theatres, and the Pacific is the responsibility of America. We are all waiting for the day of counter-attack.

GONE WEST IN THE MIDDLE EAST: A Messerschmitt Me 109F brought down near Cherva.

BRITISH AIR LOSSES TO MARCH 14th.

	Over G.B. A'crft.	Over Continent B'brs.	Over Continent F'trs.	Middle East A'crft.	Far East A'crft.
March 8	0	9	3	0	—
" 9	0	3	3	0	—
" 10	0	4	0	2	—
" 11	0	0	0	0	—
" 12	0	8	0	1	—
" 13	0	4	6	0	—
" 14	0	0	0	3	—
	0	28	12	6	—

Totals: North, 3,328; Middle East, about 1,005; Far East (unofficial) 34.

Service Aviation

Close-up of one of the Australian-built Bristol Beauforts. They are identical with those produced in this country except that the engines are 1,050 h.p. Pratt & Whitney Twin Wasps.

Royal Air Force and Fleet Air Arm News and Announcements

Promotions

Air Vice-Marshal D. C. S. EVILL, C.B., D.S.C., A.F.C., to be Acting Air Marshal. Feb. 9, 1942.

Air Cmdre. H. H. McL. FRASER to be Act. Air Vice-Marshal. Feb. 25th, 1942.

Retirements

Air Marshal (Temp. Air Chief Marshal) SIR ARTHUR M. LONGMORE, G.C.B., D.S.O., is placed on the retired list at his own request and retains the rank of Air Chief Marshal. March 1, 1942.

Air Vice-Marshal J. H. S. TYSSEN, C.B., M.C., is placed on retired list. Feb. 21st, 1942.

Awards

Fleet Air Arm (H.M.S. Audacity)

FOR bravery and skill in action against enemy aircraft and in the protection of a convoy against heavy and sustained enemy attacks:—

THE DISTINGUISHED SERVICE CROSS.

Sub-Lt. (A) D. A. HUTCHISON, R.N.; Temp. Sub-Lt. (A) E. M. BROWN, R.N.V.R.; Temp. Sub-Lt. (A) H. E. WILLIAMS, R.N.V.R.

For great bravery in the protection of merchant shipping:—

MENTION IN DESPATCHES (POSTHUMOUS).

Temp. Act. Sub-Lt. (A) R. CRIPPIN, R.N.V.R., who, as pilot of a fighter aircraft protecting a Mediterranean convoy, fought four Italian torpedo-bombers alone, and shot one of them down. He drove off the attack, but in saving the convoy he lost his life.

Royal Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy:—

DISTINGUISHED FLYING CROSS.

Act. Sqn. Ldr. J. G. TOPHAM, No. 219 Squadron.—This officer has participated in operational flying over a long period. He is a skilful and keen night fighter pilot, and, although he has frequently carried out his sorties in extremely unfavourable flying conditions, he has destroyed two Junkers 88s. Sqn. Ldr. Topham has at all times set a worthy example.

Wing Cdr. E. L. COLBECK-WELCH, No. 29 Squadron.—This officer has commanded the squadron since June, 1941, and he has participated in 70 night sorties. In January, 1942, after a pursuit lasting nearly 20 minutes, he shot down a Dornier 217 into the sea some 70 miles from the coast. This is the second enemy aircraft he has shot down at night far out to sea. Wing Cdr. Colbeck-Welch has shown tenacity and a fine fighting spirit.

Air Marshal Sir R. E. C. Peirse, K.C.B., D.S.O., A.F.C., who was until recently A.O.C. in C. Bomber Command and is now A.O.C. in C. India.

Act. Sqn. Ldr. R. G. LYNN, No. 224 Squadron.—This officer has carried out over 900 hours' operational flying, involving patrols and reconnaissances over the Atlantic Ocean, the North Sea, and off the Norwegian coast. In all conditions of weather, and in spite of encounters with the enemy, he has always completed his tasks.

On a recent occasion, on the completion of a patrol, his aircraft sustained damage from the fire of an armed ship which he was attacking. The starboard engine was damaged, the rudder trimmers shot away, and the gyro-pilot put out of action. Despite this, Sqn. Ldr. Lynn skilfully manœuvred his aircraft into some low clouds and, by jettisoning movable equipment and some fuel, he was able to regain height of a few thousand feet.

Shortly afterwards the damaged engine failed completely, but later it began to revolve again, causing the aircraft to vibrate violently and rendering it almost uncontrollable. Nevertheless, Sqn. Ldr. Lynn succeeded in flying across the sea to reach this country. Unfortunately it became necessary to abandon the aircraft by parachute, but, before leaving himself, Sqn. Ldr. Lynn made sure that all the crew got away from the aircraft safely. Throughout, this officer displayed great coolness and courage in the face of hazardous circumstances.

DISTINGUISHED FLYING MEDAL.

Sgt. J. DUPONT, R.A.A.F., No. 230 Squadron.—In December, 1941, this airman was a gunner of a Sunderland aircraft which was attacked by two Messerschmitt 110's. In the first of several attacks, two of the Sunderland's gunners were wounded, but Sgt. Dupont continued to use his guns most effectively. His accurate fire finally caused the attackers to terminate the engagement, and one of them was observed to break away with smoke pouring from both engines.

Following the engagement Sgt. Dupont's aircraft was forced to descend on to the sea. He assisted in launching the dinghies, and then sat in one of them; it was made fast to the Sunderland, and, in most arduous conditions, Sgt. Dupont prepared it for the reception of one of his mortally wounded comrades. Working under great difficulties, he successfully transferred the wounded airman into the dinghy.

The aircraft, which had remained afloat, finally drifted and struck a reef. Sgt. Dupont cast off

ALL IN A DAY'S WORK: An air photograph of Rockall, a barren volcanic rock in the Atlantic, 150 miles west of St. Kilda, which has been taken by Coastal Command at the special request of an ornithological society.

the dinghy immediately before this happened, and, swimming alongside it, he guided it clear of the aircraft and clung to it through the breaking seas. When the dinghy capsized on the surf on the reef, Sgt. Dupont held on to his wounded comrade, who was completely helpless, and eventually carried him to the shore. In the most trying circumstances, this airman displayed gallantry and fortitude worthy of the highest praise.

Sgt. R. J. WATSON, R.A.F.V.R.—In February, 1942, this airman was one of the rear gunners of an aircraft which was attacked by enemy fighters during a reconnaissance patrol. A cannon shell badly damaged the aircraft, killed another rear gunner, wounded Sgt. Watson in several places, and set a fuel tank on fire. The rear cockpit became filled with smoke and flames, but, disregarding his wounds, Sgt. Watson removed his comrade and, manning his gun in time to meet the second attack, he shot down one of the enemy aircraft into the sea.

He then endeavoured to quell the flames in the rear cockpit by throwing out burning material. His dead comrade's clothing was on fire, and, in extinguishing the flames, Sgt. Watson sustained severe burns. He was barely conscious when his pilot finally landed at an airdrome. This airman displayed great skill and courage in circumstances of extreme danger, and was largely responsible for the safe return of his aircraft.

L.A/C. N. C. SHIRLEY, No. 69 Squadron.—One day in February, 1942, this airman was an occupant of an aircraft which, in the course of an operational sortie, was attacked by enemy fighters. Although he was wounded in seven places, L.A/C. Shirley bravely fought back, using his guns with good effect. During the engagement, Very cartridges exploded in his aircraft and set fire to the back seat, but, when the attack was concluded, L.A/C. Shirley succeeded in extinguishing the flames. By his courage and presence of mind in trying circumstances, this airman, although suffering considerably from his wounds, undoubtedly saved his aircraft from destruction.

Sgt. W. L. REINHART, R.C.A.F., No. 408 (R.C.A.F.) Squadron.—This airman has participated in many sorties, including raids on Bremen, Mannheim, Hamburg and Duisberg, and mine-laying operations in enemy waters. On one occasion two ships were observed near Den Helder. One of them was attacked from a low level and direct hits were scored. Throughout, this airman has shown great skill and devotion to duty.

Sgt. R. J. SURFLEET, No. 7 Squadron.—This airman was the flight engineer of an aircraft which took part in a daylight bombing attack at Brest. Whilst over the target the aircraft sustained damage by enemy shell-fire, whereupon Sgt. Surfleet made an immediate check of all electrical services, fuel system and engine controls. The aircraft was attacked by two enemy fighters and Sgt. Surfleet made his way to the astro-hatch where he coolly gave his captain a running commentary on the engagement.

The aircraft was hit in many places by cannon shell, a piece of which tore through Sgt. Surfleet's clothing. An oxygen bottle exploded, and this airman succeeded in arresting the flow from the oxygen system. He then attempted to repair the damaged hydraulics. On return to base, Sgt. Surfleet had to lower the undercarriage by hand. Due to extensive damage to the system, only one side came down, whereupon this airman broke the knee joint in order that the aircraft could be safely landed. Throughout, Sgt. Surfleet displayed skill and initiative. He has participated in many operations over enemy territory and on two occasions has been mainly responsible for the safe return of his aircraft.

A gunner at the sights of a naval pom-pom on a destroyer. The armour plate protection appears to be very substantial.

Sgt. J. G. UFF, No. 194 Squadron.—Since September, 1940, this airman has completed numerous operational sorties. He has consistently displayed efficiency, courage and determination, combined with high ability as first wireless operator. He has participated in attacks on a wide range of enemy targets, including long-distance sorties to Stettin and Turin.

Sgt. L. C. R. WELLSTEAD, No. 99 Squadron.—This airman has carried out numerous sorties, including successful attacks on several of the most important targets in Germany. He is an extremely reliable pilot whose perseverance to complete his task has been most praiseworthy. By his coolness and skill in action he has raised his crew to a high standard of efficiency.

Roll of Honour

Casualty Communiqué No. 117.

THE Air Ministry regrets to announce the following casualties on various dates. The next-of-kin have been informed. Casualties reported "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Royal Air Force

KILLED IN ACTION.—Sgt. C. W. Mills; Sgt. L. H. Svendsen.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. H. T. M. Ainscough; P/O. P. G. Blignaut; Sgt. K. C. J. Botsford; Flt. Sgt. R. C. Brutey; Sgt. D. A. Dupree; Sgt. F. L. Green; Flt. Sgt. C. H. Horner; Flt. Sgt. P. Hudson, D.F.M.; P/O. C. E. Langdon; Cpl. G. H. Lee; Flt. Lt. A. E. Lewin; Sgt. C. D. Lynch; Sgt. H. P. Lynch; Sgt. A. Macpherson; W/O. S. J. Magee; Sgt. A. E. Routley; Sgt. H. Tait; Sgt. W. J. Tidey; P/O. E. B. Topp; Sgt. P. J. Vickery.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Act. Sqn. Ldr. L. Aitken; Sgt. R. F. Archer; P/O. F. Baldwin; Sgt. E. Bayley; P/O. P. R. S. Bird; Sgt. H. A. Bliss; P/O. S. Bowes; Sgt. R. F. Brian; Flt. Sgt. G. Brittain; F/O. H. E. Broadsmith; Sgt. J. H. Brown; Sgt. A. E. Brownbill; Sgt. J. S. Burnside; Flt. Sgt. F. A. Burrows; Flt. Sgt. G. Christie; Sgt. G. Cox; L.A/C. J. K. Dains; Sgt. C. A. Foster; Sgt. R. A. Galbraith; Sgt. N. J. Gibbin; Sgt. M. Gibson; L.A/C. W. H. Gill; P/O. K. F. Glenn; Flt. Lt. W. B. Goddard, D.F.C.; P/O. S. Goulston; Sgt. N. W. Harding; Sgt. K. Hayes; Flt. Sgt. A. F. Hill; Sgt. P. Hope; Sgt. C. H. Jacka; Sgt. T. Jones; P/O. K. E. Knox; Act. P/O. P. Lane; F/O. R. R. Langley, D.F.C.; Sgt. S. Linley; P/O. M. Littlewood; Flt. Sgt. D. J. Mackan; Sgt. M. T. Matthews; Sgt. S. C. Morse; Sgt. J. A. A. Morton; Sgt. W. R. Norman; Sgt. N. H. Nuttall; F/O. M. Parry; Sgt. S. P. Plumb; Sgt. A. Poupard; Cpl. H. R. Pye; Sgt. S. C. Retter; Sgt. B. Ryall; Sgt. I. D. Scourfield; Sgt. A. A. C. Shaddick; Act. Sqn. Ldr. R. A. Shuttleworth; Sgt. F. A. S. Smith; Sgt. K. E. Taylor; Sgt. S. Vardy; Sgt. A. Whitworth; Flt. Sgt. G. T. Wood; P/O. F. H. Yard.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—P/O. A. S. Mackie.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. E. S. Briggs; P/O. J. N. Chisholm; Sgt. P. G. Clark; Sgt. E. Connelly; Sgt. R. D. Fletcher; Flt. Lt. R. Fox; P/O. J. G. C. Grieve; Sgt. R. R. Hall; Sgt. G. Hancock; Sgt. J. A. Hilton; P/O. R. Huggins; P/O. J. G. K. Hulbert; Sgt. J. F. Lait; P/O. B. W. Main; Sgt. A. J. Nuttall; Sgt. J. T. Perk; Sgt. A. L. Pepper; Sgt. R. I. Rhodes; P/O. C. J. Rowley; Sgt. R. A. Scott; P/O. A. D. Scott-Martin; Sgt. N. C. Slee; Sgt. K. E. Stewart; P/O. R. E. Taylor; Sgt. S. G. Thompson.

MISSING.—Sgt. W. J. Atwell; Sgt. R. Ballantyne; F/O. J. N. G. Bateman; Flt. Sgt. G. E. A. Baxter; Act. Wing Cdr. J. E. D. Benham; Sgt. K. M. Bird; Flt. Sgt. S. D. Birdsall; Sgt. E. W. A. Biddlecombe; Sgt. A. Brittain; Cpl. I. D. Brown; Sgt. J. E. Browne; A/C.1 F. Burn; Sgt. W. C. Clark; Cpl. C. T. Clay; L.A/C. S. Cook; Sgt. S. A. Dungley; P/O. J. M. Fisher; Sgt. D. Gold; Sgt. O. Haggan; Sgt. B. V. Harris; Flt. Sgt. H. F. Hicks; Flt. Sgt. P. H. Hillebrand; A/C.1 W. Hutchinson; Sgt. C. J. Irwin; Sgt. E. K. Jones; Act. Sqn. Ldr. W. O. Jones; L.A/C. A. Kessack; Act. Sqn. Ldr. L. N. Landels; L.A/C. D. F. Lister; L.A/C. L. D. Llewellyn; Flt. Sgt. C. H. Lockwood; Flt. Sgt. E. Lyall; Sqn. Ldr. R. F. C. Markham; Sgt. P. May; Sgt. P. G. Milton; P/O. J. E. Morrison; Rev. Sqn. Ldr. N. K. Nye; Sgt. C. Paterson; Sgt. T. A. Peters; Flt. Lt. G. S. Richardson; Sgt. G. M. Robinson; Sgt. W. Rowell; Sgt. A. F. Scott; Sgt. M. W. Scott; Flt. Sgt. J. B. Seaton; Sgt. E. J. Snelling; Sgt. N. Stead; Act. Flt. Lt. R. H. Strang; Sqn. Ldr. J. D. Tillott; Sgt. F. G. Truscott; Sgt. J. D. White; F/O. F. E. Wilcox; Sgt. J. G. Wilson; P/O. J. F. Wright.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—P/O. J. M. Joyce-Clarke.

KILLED ON ACTIVE SERVICE.—A/C.2 A. A. Ackred; F/O. T. E. O. de la P. Beresford; A/C.1 W. E. Brown; Sgt. A. R. Cheadle; A/C.2 J. Cooley; L.A/C. R. F. J. Crowhurst; Act. Wing

AVIATION

Cdr. A. M. Diamant; Sgt. J. A. Eckersley; L.A/C. R. Haslam; L.A/C. M. G. Lacy; Cpl. E. W. Langley; Sgt. J. H. Marshall; Sgt. R. S. Raines; Sgt. K. Riding; Sgt. J. Ruddock; A/C.2 G. T. Taylor.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. W. Allison; P/O. C. W. S. Bristow; Sgt. E. G. Buckingham; L.A/C. J. C. Croome; Sgt. L. Parry; Sgt. J. A. Tyrrell.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW REPORTED KILLED ON ACTIVE SERVICE.—P/O. R. P. Hay.

WOUNDED OR INJURED ON ACTIVE SERVICE.—A/C.1 G. H. Bucknell; Cpl. J. A. J. Johnson; A/C.2 O. V. Maxim; L.A/C. G. G. Taylor.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. A. Hay; Sgt. T. G. Smith.

DIED ON ACTIVE SERVICE.—A/C.1 F. D. Bailey; A/C.2 F. G. Bradley; A/C.2 J. Currie; A/C.2 A. Denton; Cpl. L. W. Disney; A/C.2 R. J. Greathead; A/C.2 H. Hughes; A/C.2 F. T. C. Jones; A/C.2 J. Kerr; Cpl. V. F. Morris; A/C.1 A. W. S. Ross; Cpl. S. Ryder; L.A/C. H. A. Wilson.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. G. P. Williams.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. E. B. N. Currie; P/O. D. K. Oak-Rhind; Sgt. R. J. B. Rost; P/O. S. L. St. Vincent-Welch; Sgt. W. M. Symmonds.

WOUNDED OR INJURED IN ACTION.—Sgt. G. A. L. Sharp.

MISSING.—Sgt. J. R. Bell; Sgt. J. H. Brady; Sgt. E. H. Brown; Sgt. J. R. Brown; Sgt. A. T. Carter; F/O. S. N. Chesterman; Sgt. G. N. Church; P/O. F. E. Cummins; Sgt. D. C. Devlin; Sgt. A. G. Duxbury; Sgt. J. H. Hehir; Sgt. G. S. Howiss; Sgt. H. N. Kelly; Sgt. J. H. Lockhart; Sgt. E. C. Nodrum; Sgt. H. W. Parsons; Flt. Lt. C. H. Sourgeon; P/O. A. E. Turner.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—P/O. J. D. B. Rowlands.

KILLED ON ACTIVE SERVICE.—L.A/C. W. E. Stone.

Royal Canadian Air Force

KILLED IN ACTION.—Sgt. A. I. Murray.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. A. G. Geddes; Sgt. J. A. D. Rheaume.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. T. E. McGeragle; Sgt. W. Maxwell.

MISSING.—Flt. Sgt. R. K. Craig; Sgt. N. H. Grey; Flt. Sgt. J. A. Jacobson; Sgt. C. F. Marsh; Sgt. F. A. Tait; P/O. G. H. Webster.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. J. H. Bye.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. T. W. Dabinette; Sgt. A. H. Fraser; Sgt. I. F. Waugh.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. G. R. Cameron.

MISSING.—P/O. R. C. Barclay; Sgt. H. S. Brown; Sgt. C. D. Charters; Sgt. J. E. Smith; Sgt. T. Tanner.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—P/O. D. T. Austen.

South African Air Force

WOUNDED OR INJURED IN ACTION.—2/Lt. M. Stewart.

KILLED ON ACTIVE SERVICE.—2/Lt. H. D. Adams; Lt. B. W. Schild.

DIED ON ACTIVE SERVICE.—Sgt. R. C. Varley.

Casualty Communique No. 118.

Royal Air Force

KILLED IN ACTION.—Sgt. W. G. Carrie; Sgt. L. Jennings; Sgt. T. H. Johnston; Wing Cdr. A. M. Mulliken.

PREVIOUSLY REPORTED KILLED ON ACTIVE SERVICE, NOW REPORTED KILLED IN ACTION.—P/O. D. T. McLaren.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. L. Acres; Act. Flt. Lt. F. H. Craig; Sgt. G. A. Dvorjetz; Sgt. R. J. Garrod; P/O. J. Grant; Sgt. G. D. Jackson; P/O. J. F. Laurie-Dickson; Sgt. D. Love; P/O. R. H. M. Munroe; Act. Wing Cdr. T. N. Partridge; Sgt. C. E. Powell; Sgt. W. H. Price; Sgt. A. E. Sainsbury; Flt. Sgt. J. O. N. Smith, D.F.M.; P/O. G. G. Watts; Sqn. Ldr. E. P. Willcox, D.F.C.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. C. G. Alway; Flt. Sgt. M. H. S. Bolton; Sgt. J. W. Bottomley; Sgt. G. W. Brown; P/O. G. F. Burbidge; Flt. Sgt. L. R. Carter; Sgt. J. S. Clover; P/O. A. H. Collins; Sgt. G. A. Cook; P/O. R. le M. Cox; Sgt. J. Crocombe; Sgt. R. F. Culley; Flt. Sgt. J. R. Dale; Sgt. E. G. R. Drobig; Sgt. R. W. Duke; Sgt. L. A. Evetts; Sgt. I. P. M. Gordon; P/O. S. F. M. Gunnis; Flt. Sgt. B. P. Hanson; P/O. P. A. Harris; Act. F/O. V. R. Hartwright, D.F.M.; P/O. D. W. Horrocks; P/O. J. E. Horsfield; Flt. Sgt. D. A. Huntley; Sgt. F. T. Kearney; Sgt. C. V. Matheson; Sgt. W. M. K. Mellon; Sgt. N. B. Morrison; Act. Flt. Lt. R. Mottram; Sgt. H. K. Orme; Sgt. L. C. Page; Sgt. J. Parsons; P/O. J. F. Philpott; Flt. Sgt. D. H. G. Poole, D.F.M.; Sgt. J. G. Selley; Flt. Sgt. L. H. W. Smith; Flt. Sgt. J. W. Stanley; Sgt. C. J. Storer; Flt. Sgt. G. W. Tabor; P/O. F. B. Thorpe; Sgt. W. E. Tulley; Sgt. A. Webster; F/O. R. G. M. Whigham; P/O. J. O. H. Willing; Sgt. G. Wooller; Sgt. H. Yardley.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—A/C.2 J. Robinson.

WOUNDED OR INJURED IN ACTION.—Sgt. A. W. J. Beagley; Sgt. G. F. H. Booth; P/O. W. A. Leavett; Sgt. H. S. Lodge; Sgt. W. H. Olrod; Sgt. P. J. Sheridan; F/O. A. Tofield; Sgt. R. J. Watson; Sgt. E. C. Wiles.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. T. Hayward; Sgt. D. C. Pound.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. R. Bain; Sgt. D. Curnick; Sgt. E. J. R. Fowler; Sgt. H. Smith; Sgt. J. Towns; P/O. D. L. Williams.

MISSING.—P/O. D. L. Atkinson; A/C.1 A. J. Best; P/O. F. A. Black; Sgt. W. Black; Sgt. J. A. Bolle; Flt. Sgt. C. J. S. Borras; Sgt. L. Briggs; Act. Sqn. Ldr. T. N. C. Burrough, D.F.C.; Sgt. T. A. Butterworth; Flt. Sgt. J. Cadden; F/O. I. R. Campbell; Sgt. L. W. Dann; L.A/C. F. F. Devrell; Sgt. T. A. Evans; F/O. D. J. R. Gee; Sgt. J. Gibson; A/C.1 A. Gough; Sgt. B. Hayes; Sgt. W. T. Holmes; Sgt. D. S. Jones; Sgt. P. L. E. le Queux; Sgt. G. J. Linegar; Sgt. G. H. Marshall; W/O. A. N. Mowley; Flt. Lt. H. C. S. Page, D.F.C.; Act. F/O. J. R. E. Parsons; A/C.1 A. T. Patton; Flt. Sgt. D. J. Pitcher; Sgt. J. V. Randall; Sqn. Ldr. I. T. B. Rowland; Sgt. C. J. Stringer; Sgt. H. E. Turner; Sgt. R. W. Weymouth; Sgt. A. L. Wright.

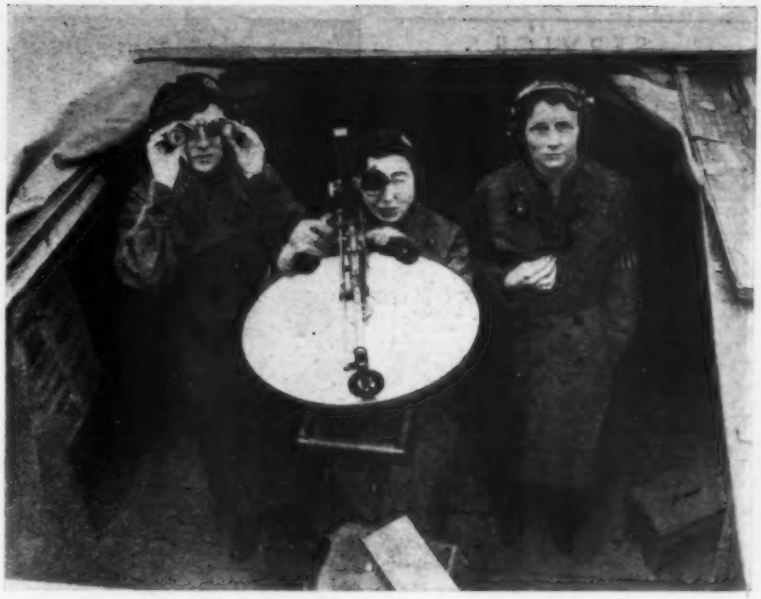
KILLED ON ACTIVE SERVICE.—Sgt. S. Appley; Sgt. A. Bennet; L.A/C. R. A. Berry; L.A/C. L. G. Blower; Sgt. T. G. Cameron; Sgt. J. Crossley; L.A/C. V. J. Deverson; L.A/C. A. G. Ednie; Sgt. J. A. Farmer; A/C.1 W. Fullbrook; Sgt. W. Gorman; Sgt. W. C. Green; L.A/C. L. P. L. Griffith; Sgt. W. H. Griffiths; L.A/C. J. F. Hope; Sgt. W. J. Howson; Sgt. T. Jack; A/C.1 P. J. Jackson; Sgt. A. E. Jaeckels; P/O. J. H. Kirk; Sgt. T. Lawrence; Sgt. J. R. Lord; L.A/C. A. R. Meldrum; L.A/C. R. D. Mollett; Cpl. R. A. Price; Sgt. J. Pringle; A/C.2 W. Squires; A/C.2 G. Stewart; P/O. P. M. Stobie; P/O. J. R. A. Stuart; Sgt. R. K. R. Talbot; Cpl. A. T. Tapping; Sgt. D. H. Tyne; L.A/C. C. W. Wadkinson; Sgt. D. F. J. Ward; P/O. H. Waugh; A/C.1 S. White; A/C.1 F. C. Widdicombe; A/C.2 J. M. Wood.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. A. J. Connell; A/C.1 A. G. Davies; Sgt. T. G. Freeman; A/C.2 J. Perkins.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW REPORTED KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. B. Birtles.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED ON ACTIVE SERVICE.—P/O. W. B. Inabinet.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. D. E. J. Battle; A/C.1 P. W. Bush; P/O.



Women are now joining the Royal Observer Corps as part-time members for day duties. The photograph shows a post in East Anglia.

The view through the bomb aimer's panel of a Halifax while being towed by a tractor. To the crews the tractor is always known as the "Tug."

SERVICE

M. F. O. Clarke; L.A/C. F. L. Harrop; L.A/C. L. F. Houlton; Sgt. J. Lapish; P/O. P. H. Lowther; L.A/C. A. Marshall; L.A/C. H. J. Maude; L.A/C. L. B. Morton; Sgt. W. R. H. Pateman; Cpl. R. C. Piggott; L.A/C. W. R. Pring; Flt. Sgt. H. K. Richardson; L.A/C. A. J. Rogers; Sgt. A. H. Stewart; Act. P/O. G. H. Williams.

DIED OF WOUNDS ON INJURIES RECEIVED ON ACTIVE SERVICE.—Cpl. A. Cox; Sgt. R. Marshall; A/C.1 J. Pirotta; Cpl. J. Smith; Sgt. D. A. G. Sullivan; L.A/C. V. Turner.

DIED ON ACTIVE SERVICE.—L.A/C. J. B. Anderson; L.A/C. M. Bergmann; A/C.2 J. E. Bryan; A/C.1 G. Butlin; Cpl. C. A. Chenery; L.A/C. A. E. Coppins; A/C.1 S. C. Davies; A/C.2 W. N. Densham; Cpl. G. A. Gimbert; A/C.2 J. Glen; Cpl. C. E. Goodsall; L.A/C. C. M. Hayhurst; L.A/C. S. G. James; A/C.2 F. W. Kear; A/C.2 R. M. Lloyd; L.A/C. E. T. Markham; A/C.2 J. H. Plant; Sgt. F. C. Robins; A/C.2 J. C. Trafford; A/C.1 S. F. Vaughan; Sgt. A. Walker; Cpl. J. Walker; A/C.2 C. W. Watson; P/O. F. J. Wilson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. J. E. Hughes; Sgt. T. Ingham-Brown.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW.2 J. Heley.

Royal Australian Air Force

KILLED IN ACTION.—Sgt. H. W. Tindley

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. G. K. Bartlett; Sgt. D. V. Logan.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. M. H. Watson.

WOUNDED OR INJURED IN ACTION.—Sgt. R. Borcher; Sgt. K. R. Burrill; Sgt. G. C. Coward; Sgt. R. R. Hark; Sgt. J. C. Whittle.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. E. A. Peterson.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. A. N. Williams.

MISSING.—P/O. A. G. Burt; Flt. Sgt. A. Frost; F/O. K. Hewitt; Sgt. E. W. Jacobsen; Flt Lt. H. C. Plenty.

KILLED ON ACTIVE SERVICE.—Sgt. W. G. Bothe; Sgt. R. C. Denley; Sgt. P. M. Piggott; Sgt. N. W. R. Wood; Sgt. L. D. Wright.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt L. G. Morey; Cpl. C. J. Say.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Act. Sgt. I. E. Lillie.

Royal Canadian Air Force

KILLED IN ACTION.—Sgt. J. R. Petts.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. J. G. Keating; P/O. F. K. Orme; Sgt. L. G. Sinclair; Sgt. B. G. Wilbee.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. W. M. Baker; Sgt. H. A. Wilkins.

MISSING.—Sgt. W. Fitch, Sgt. S. J. Maclean; Flt. Sgt. W. H. Shorrock.

KILLED ON ACTIVE SERVICE.—Sgt. R. F. Anderson; P/O. A. R. Kirby; Sgt. J. D. Lenehan; Sgt. N. C. Pow; Sgt. W. E. G. Taylor.

DIED ON ACTIVE SERVICE.—P/O. J. G. Hoar.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. F. G. S. Fox.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. R. W. Brookman; Sgt P. T. Takarangi.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. F. A. Baty; Sgt. G. Carman; Sgt. B. D. J. Kennedy.

MISSING.—Sgt. R. J. McNabb.

KILLED ON ACTIVE SERVICE.—Sgt. A. Lawrie.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. E. W. Dense; L.A/C. F. L. Schdroski.

South African Air Force

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Capt. J. H. Eccles.

Casualty Communique No. 119.

Royal Air Force

KILLED IN ACTION.—Sgt. F. W. Baker; Sgt. V. L. Lloyd.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. J. R. Bushell; Sgt. G. M. Carnall; Sgt. J. Chapman; Sgt. D. W. E. Chapple; Sgt. A. Chiplin; Sgt. A. T. Cole; Flt. Lt. J. K. Collins; Sgt. D. A. Dean; Sgt. P. H. Eve; Sgt. W. Hardie; P/O. A. Hipps; Sgt. D. H. Jeeves; Sgt. C. Kelly; Sgt. B. W. O'Hara; Sgt. C. W. Onions; Sgt. L. O. Orchard; Sgt. F. S. Payne; Sgt. R. S. Saunders; Sgt. S. N. Symondson; Sgt. H. Tucker; Sgt. H. Vernon; Sgt. J. Wardrop; P/O. A. W. Wilkinson; Sgt. F. C. Williams; Sgt. K. R. Winter.

Flt. Lt. G. F. L. Coates, O.C. High-Speed Launch Base, Dover, who is the first R.A.F. officer to be awarded the naval D.S.C.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. C. J. Bevan; Sgt. S. E. Bird; Sgt. L. Byrne; Sgt. E. K. Cartledge; Flt. Sgt. W. E. Cass; Sgt. F. W. R. Charles; P/O. J. K. Charles-Jones; Sgt. R. Copeland; P/O. R. W. Dawson; Sgt. G. F. Entwistle; Sgt. D. M. Evans; Sgt. J. A. G. Forsyth; Sgt. G. F. W. Gahagan; Sgt. D. W. Griffiths; Sgt. J. Hall; Sgt. C. L. Harrison; Sgt. A. R. Holmes; F/O. A. G. Inderwick; P/O. A. C. Johnson; F/O. M. M. Lambert; F/O. J. G. Lane; P/O. J. T. Leacock; Sgt. G. B. Lewis; Flt. Sgt. J. N. Lister; Sgt. W. A. MacKillop; Sgt. J. K. McFarlane; Sgt. W. A. McGinley; P/O. F. McHardy; P/O. A. C. MacPherson; Sgt. A. S. Marshall; Flt. Sgt. K. W. Morgan; P/O. H. H. Mountain; Sgt. L. Netherclift; Sgt. E. G. Nethercott; Sgt. A. G. Oliver; F/O. H. Oxlin; Sgt. I. E. Pearce; Sgt. H. A. Perks; Sgt. F. C. Pocock; P/O. W. L. Rees; Sgt. A. S. Rowan; Sgt. A. M. Smith; Flt. Sgt. S. A. Smith; Sgt. J. H. Smyth; F/O. M. F. Suckling; Act. Sqn. Ldr. H. F. Thomson; Flt. Sgt. H. K. Threwhella; P/O. M. D. Tucker; Sgt. J. M. B. Tunnah; Sgt. A. E. Varnevérry; Sqn. Ldr. E. A. Verdon-Roe; Flt. Sgt. A. E. Vickers; P/O. J. H. Walls; Sgt. G. L. Wells; Flt. Sgt. L. C. Williams; Flt. Sgt. J. S. Willis; P/O. J. Wood.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. P. O. D. Allcock; Sgt. C. A. MacVean; P/O. E. H. C. Theobald.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. E. J. Barrett; Sgt. E. M. F. Bearcroft; P/O. J. Bergson; Sgt. J. W. Cadman; Sgt. C. R. Collinson; Sgt. A. W. Deere; Sgt. G. D. Evenett; Sgt. E. Fieldsend; Sgt. A. J. N. Fry; P/O. J. G. S. Gardiner; P/O. C. A. C. Havelock; Sgt. R. Shuttleworth; Sgt. C. H. Stokell; P/O. C. J. C. Walker; Sgt A. Waterworth; Sgt. G. E. Wilkinson; Sgt S. Williams.

MISSING.—P/O. J. P. Bartlett; Sgt. E. Bland; Flt. Lt. J. W. Blennerhassett; Sgt. R. A. Billington; Sgt. J. Blight; Sgt. A. G. Bocock; Sgt. B. E. Brown; Sgt. E. Brown; Flt. Sgt. N. Clare; P/O. G. D. Dodd; Flt. Sgt. H. L. V. Evans; F/O. G. S. Forbes; Sgt. J. Grant; Sgt. L. Hamilton; Sqn. Ldr. J. V. Hoggarth; A/C.1 E. Hopkinson; Set. G. W. E. Jacobson; Sgt. H. Jones; Act. F/O. H. Kitchin; A/C.1 J. W. March; Flt. Sgt. H. S. Mason; Sgt. K. C. Nutt; Sgt. T. E. Orr; Sgt. T. P. O'Riordan; Sgt. D. M. Pickersgill; Sgt. A. A. Rolfe; Sgt. J. F. C. Smith; Flt. Sgt. R. N. Smith; Flt. Lt. F. W. Smith; P/O. G. Sproates; Flt. Sgt. J. Stables; Sgt. R. J. Winstanley.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—P/O. W. J. P. Olney.

KILLED ON ACTIVE SERVICE.—P/O. W. F. Avery; Sgt. N. Battram; Sgt. G. A. Blackwood; P/O. F. W. Buckland; Sgt. J. L. Clark; Sgt. T. R. Gamble; Sgt. E. G. Hatch; Sgt. H. W. Holland; Sgt. R. G. Holmes; P/O. C. D. F. Kaye; Sgt. F. King; Sgt. A. R. R. Lane; Sgt. V. Meldrum; F/O. G. G. W. Pledger; L.A/C. R. G. Robbins; L.A/C. J. S Scholes; Sgt. A. Smith; L.A/C. P. D. Underwood.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—P/O. W. M. Bishop; P/O. J. R. Cox; P/O. H. H. Hay; P/O. F. J. Kruszynski; Flt. Lt. D. L. Rayment, A.F.C.; Sgt. D. R. Reader; Sgt. R. Sadler.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. E. D. Glyde; Cpl. E. J. Hedley-Smith; Act. Flt. Lt. S. Proud; L.A/C. F. V. Thom.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW REPORTED KILLED ON ACTIVE SERVICE.—Sgt. W. T. Higgs; P/O. A. G. Murray Smith.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. R. J. Collier; P/O. T. A. Coomber; L.A/C. J. Denoon; L.A/C. P. Kelly; Sgt. E. T. Mears; F/O. G. R. Ross, D.F.C.; L.A/C. J. P. Singleton; P/O. H. K. Spark.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—A/C.2 D. W. Otter; Flt. Lt. E. W. Tate.

DIED ON ACTIVE SERVICE.—L.A/C. Ayling; L.A/C. L. Cook; A/C.2 J. Guest; Sqn. Ldr. K. T. A. Harvey, D.F.C.; A/C.2 R. J. M. McDonald; A/C.2 C. J. Richardson; A/C.2 R. E. Thomas; A/C.1 G. Walker.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sqn. Ldr. T. D. Calnan.

Amendment to Casualty Communique No. 111.

Sgt. A. R. Bernard should have appeared under heading "Died of Wounds or Injuries Received in Action" and not under "Died on Active Service."

AVIATION

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/C.W.2 K. Boyes; A/C.W.2 I. E. M. Guy.

Royal Australian Air Force

KILLED IN ACTION.—Sgt. H. J. Cross.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. J. A. Cormack; Sgt. J. F. James; P/O. D. A. R. Munro.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. L. G. Whibley.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. I. M. Ince.

MISSING.—P/O. L. George; Sgt. N. S. Gill; Sgt. J. H. Henderson; Sgt. C. McCabe; Sgt. C. Macdonald; Sgt. N. Provan; P/O. R. W. Smith.

KILLED ON ACTIVE SERVICE.—Sgt. L. E. Beutel; Sgt. S. C. Johnson; Sgt. C. C. McLennan.

Royal Canadian Air Force

KILLED IN ACTION.—Sgt. A. G. Patrick.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. T. L. Duxbury; Sgt. N. L. Johnston; Sgt. R. H. Wilson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. F. H. Beemer; Sgt. D. W. Bennett; Flt. Sgt. I. P. Graham; Sgt. H. P. Hartridge; Sgt. J. D. MacVicar; Sgt. C. M. Martin; Flt. Sgt. F. J. Matkin; Sgt. J. H. Roberts; P/O. F. W. J. Scott.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. F. J. Goat; Sgt. W. Jowett; Flt. Sgt. E. D. Ozment.

MISSING.—Sgt. C. E. Carroll; Sgt. H. E. Johnson; Sgt. D. M. Lindsay; Sgt. W. A. Pickering.

KILLED ON ACTIVE SERVICE.—Sgt. W. A. Campbell; Sgt. B. H. Cassidy; Sgt. G. A. Davis; Sgt. W. R. Donaldson; Sgt. F. Llewellyn; Sgt. A. J. Maher; Flt. Lt. D. G. Morris; Flt. Lt. J. M. Ogilvie; Sgt. E. G. Parsons; Sgt. W. G. Smith.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Cpl. G. J. Giguere; Sgt. C. D. McCausland.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—P/O. R. R. Hines.

DIED ON ACTIVE SERVICE.—Sgt. D. Hone.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. I. G. Ovenhen, D.F.M.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Act. Flt. Lt. A. B. Baird; Sgt. R. E. E. Fotheringham.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—P/O. R. S. Masters.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. H. J. Grut; Sgt. R. A. Hamilton.

MISSING.—P/O. H. H. Crawford; Sgt. B. P. Hoare; Sgt. D. B. S. Lee.

KILLED ON ACTIVE SERVICE.—P/O. S. C. Jones.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. W. Higgins.

South African Air Force

DIED ON ACTIVE SERVICE.—A/C. E. L. Dalton.